Tampa, FL NATTS Network Assessment Review

- Established 2004: Carbonyls, PM_{10} Metals, and VOCs
  - Chromium VI added in 2005; ended in in 2013
  - PAHs added in 2008
  - Ethylene oxide added in 2020
- For the NATTS Network Assessment (2004-2022):
  - 17 of 17 Method Quality Objective (MQO) Core HAPs were included in the national trends
  - 307 of 313 pollutant datasets were suitable for trends analysis
  - Annual Average and 3-Year Rolling Average Concentrations were decreasing for benzene, 1,3-butadiene, lead (PM_{10}), nickel (PM_{10}), tetrachloroethylene, trichloroethylene, and vinyl chloride.
  - 100% Reporting of Datasets
- Method Quality Objectives (MQO): 2004-2022
  - Completeness: Met 85% completeness in 313 of 313 pollutant datasets
  - Method Detection Limits: Met MDL Target Ratio of 1.00 in 301 of 315 pollutant datasets
  - Bias: Met ±25% for 267 of 279 pollutant datasets
  - Overall Method Precision: Met ≤15% CV for 100 of 157 pollutant datasets
  - Analytical Method Precision: Met ≤15% CV for 158 of 192 pollutant datasets
- Analytical Laboratories for 2022

VOC	Carbonyl	PM_{10} Metals	PAHs
PCDEM	ERG	EPCHC	EPCHC

- Equipment Year Deployed

Equipment Type	VOC	Carbonyl	PM_{10} Metals	PAHs
Sampler	2004	2017	Unknown	2014
Analytical	2022	2018	2014	2021
Preconcentrator	2022	NA	NA	NA
Standards Preparation	2007	NA	NA	NA
Canister Cleaning	2005	NA	NA	NA
Extraction	NA	NA	2006	2019

National Summary: NATTS data were collected at 27 locations across the United States, with sites beginning in 2003 or later (Figure 1) for 20 core HAPs. Over 670,000 concentrations (primary, secondary, and replicate) were generated and analyzed for this assessment. Pollutant datasets were scored to assess whether they were suitable for trends analysis. Each pollutant dataset was evaluated against four MQOs: Completeness; Sensitivity; Bias; and Precision. Datasets that were suitable (A- or B-rated) for six consecutive years were used for national trends analysis (Table 1).

National trends were determined by comparing the most recent 3-year blocked averages (e.g., 2017-2019 vs. 2020-2022) to determine if the NATTS Trends DQO was being met:

To be able to detect a 15 percent difference (trend) between the annual mean concentrations of successive 3-year periods within acceptable levels of decision error.

Of the 20 core HAPs. 17 were assessed for the NATTS Trends DQO. Due to sampling and analytical issues, acrolein and ethylene were not considered for trends analysis (Table 2). Additionally, hexavalent chromium was discontinued as a required pollutant . The assessment showed that across the network, 11 of those 17 pollutants were decreasing between the 3-year blocks, while four of those pollutants were increasing between the 3-year blocks. Two pollutants did not exhibit a noticeable trend.

Figure 1. NATTS Site and Year Established

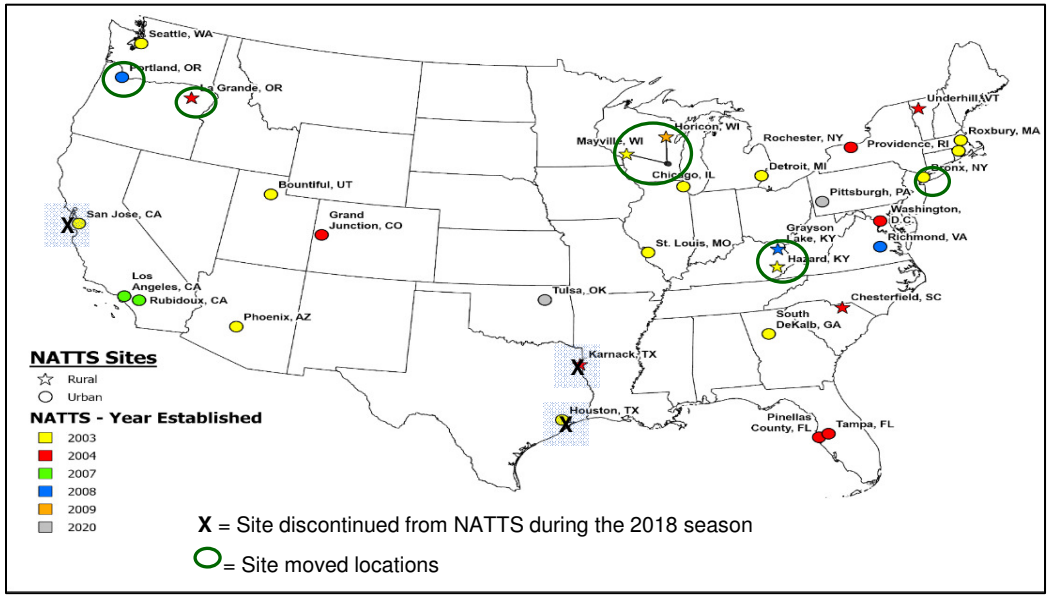


Table 1. NATTS Network Assessment: Count and Percentage of Suitable Datasets by Pollutant Group

Pollutant Group	A-rated		B-rated		Does Not Meet	
	#	%	#	%	#	%
VOCs	1,968	58%	864	25%	572	17%
Carbonyls	668	68%	231	24%	77	8%
PM_{10} Metals	1,906	66%	775	27%	217	7%
PAHs	571	77%	144	19%	29	4%
Total = 8,704	5,113	64%	2,014	25%	895	11%

Table 2. Three-Year Block Averages for National Trends

Pollutant[a,b]	Units	# Sites	Block 1	Block 2	% Difference
Acetaldehyde	µg/m^3	16	1.48	1.34	-9.2%
Arsenic (PM_{10})	ng/m^3	18	0.68	0.64	-6.6%
Benzene	µg/m^3	16	0.529	0.525	-0.8%
Benzo(a)pyrene	ng/m^3	18	0.086	0.072	-16.6%
Beryllium (PM_{10})	ng/m^3	18	0.008	0.010	15.0%
Butadiene, 1,3-	µg/m^3	15	0.057	0.054	-5.1%
Cadmium (PM_{10})	ng/m^3	20	0.087	0.090	3.7%
Carbon Tetrachloride	µg/m^3	15	0.53	0.50	-5.3%
Chloroform	µg/m^3	16	0.173	0.165	-4.8%
Formaldehyde	µg/m^3	15	2.809	2.482	-11.7%
Lead (PM_{10})	ng/m^3	20	2.44	2.43	-0.5%
Manganese (PM_{10})	ng/m^3	20	6.69	7.31	9.2%
Naphthalene	ng/m^3	17	42.00	35.10	-16.4%
Nickel (PM_{10})	ng/m^3	19	0.87	0.83	-3.7%
Tetrachloroethylene	µg/m^3	15	0.12	0.12	1.5%
Trichloroethylene	µg/m^3	14	0.019	0.022	16.3%
Vinyl Chloride	µg/m^3	16	0.004	0.001	-69.0%

[a] Acrolein and ethylene oxide were not assessed due to sampling and analytical issues

[b] Hexavalent chromium (not assessed) was discontinued in 2013

NATTS Monitoring Site Report: Tampa, FL

Site Information

Region	4
NATTS Site Type	Urban
County	Hillsborough
AQS Site Code	12-057-3002
NATTS Operating Agency	Env. Prot. Commis. Hillsborough County
Latitude	27.96565
Longitude	-82.2304
AQS Land Use	Residential
AQS Location Setting	Rural
County Population (2023)	1,535,564

Figure 2. NATTS Site Location

Pollutant Datasets Evaluation: Suitable for Trends (Y=yes; Y(T)=yes, and used for DQO Trends; N=No; "--"=not rated)

Final Pollutant Name	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Acetaldehyde	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Arsenic (PM_{10})	N(a)	N(a)	N(a)	N(a)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Benzene	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Benzo(a)pyrene	--	--	--	--	--	Y	Y	Y	Y	Y	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Beryllium (PM_{10})	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Butadiene, 1,3-	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Cadmium (PM_{10})	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Carbon tetrachloride	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Chloroform	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Formaldehyde	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Lead (PM_{10})	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Manganese (PM_{10})	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Naphthalene	--	--	--	--	--	Y	Y	Y	Y	Y	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Nickel (PM_{10})	Y	Y	N(a)	Y	Y	Y	Y	Y	Y	N(b)	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Tetrachloroethylene	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Trichloroethylene	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)
Vinyl chloride	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)	Y(T)

[a]: Reported MDL to NATTS Target Ratio greater than 2.0

[b]: Bias % Difference was outside ± 35% for 2013; Analytical Precision data was not reported to EPA for 2013.

Table 3. NATTS Network Assessment Data (2003-2022) - National Distribution Statistics By Type[a]

Analyte	Units	Site Type	# Data Records	% Detections	Arithmetic Mean[b]	Percentile Value[c]						
						5th	10th	25th	50th	75th	90th	95th
Acetaldehyde	µg/m^3	Urban	22,000	100%	1.73 ± 0.02	0.50	0.65	0.95	1.42	2.15	3.19	3.96
	µg/m^3	Rural	6,392	100%	1.17 ± 0.03	0.36	0.45	0.65	0.92	1.35	1.98	2.67
	µg/m^3	All Sites	28,392	100%	1.61 ± 0.02	0.45	0.58	0.85	1.29	1.97	2.99	3.79
Arsenic (PM_{10})	ng/m^3	Urban	21,944	95%	0.87 ± 0.03	0.03	0.16	0.32	0.56	0.96	1.65	2.37
	ng/m^3	Rural	6,385	96%	0.49 ± 0.02	0.03	0.08	0.16	0.35	0.58	0.93	1.30
	ng/m^3	All Sites	28,329	96%	0.78 ± 0.02	0.03	0.13	0.27	0.51	0.87	1.51	2.16
Benzene	µg/m^3	Urban	22,246	99%	0.85 ± 0.01	0.23	0.29	0.42	0.64	1.02	1.62	2.20
	µg/m^3	Rural	5,932	90%	0.52 ± 0.01	ND	0.06	0.20	0.38	0.67	1.08	1.51
	µg/m^3	All Sites	28,178	97%	0.78 ± 0.01	0.16	0.23	0.36	0.58	0.95	1.52	2.07
Benzo(a)pyrene	ng/m^3	Urban	17,810	73%	0.10 ± 0.01	ND	ND	ND	0.04	0.10	0.23	0.35
	ng/m^3	Rural	4,735	37%	0.07 ± 0.01	ND	ND	ND	ND	0.02	0.19	0.38
	ng/m^3	All Sites	22,545	65%	0.09 ± 0.01	ND	ND	ND	0.03	0.09	0.22	0.35
Beryllium (PM_{10})	ng/m^3	Urban	21,786	77%	0.042 ± 0.004	ND	ND	0.0005	0.005	0.015	0.043	0.098
	ng/m^3	Rural	6,062	49%	0.018 ± 0.002	ND	ND	ND	ND	0.004	0.012	0.041
	ng/m^3	All Sites	27,848	71%	0.037 ± 0.003	ND	ND	ND	0.003	0.011	0.038	0.083
Butadiene, 1,3-	µg/m^3	Urban	22,220	78%	0.092 ± 0.002	ND	ND	0.018	0.051	0.110	0.215	0.317
	µg/m^3	Rural	5,940	29%	0.017 ± 0.001	ND	ND	ND	ND	0.011	0.054	0.104
	µg/m^3	All Sites	28,160	68%	0.076 ± 0.002	ND	ND	ND	0.039	0.092	0.190	0.283
Cadmium (PM_{10})	ng/m^3	Urban	21,954	93%	0.184 ± 0.014	ND	0.019	0.043	0.081	0.160	0.354	0.572
	ng/m^3	Rural	6,067	89%	0.092 ± 0.005	ND	ND	0.026	0.055	0.099	0.179	0.270
	ng/m^3	All Sites	28,021	92%	0.164 ± 0.011	ND	0.012	0.039	0.075	0.143	0.300	0.518
Carbon Tetrachloride	µg/m^3	Urban	22,202	98%	0.556 ± 0.002	0.336	0.423	0.486	0.550	0.638	0.725	0.784
	µg/m^3	Rural	5,909	84%	0.494 ± 0.010	ND	ND	0.342	0.533	0.629	0.728	0.807
	µg/m^3	All Sites	28,111	95%	0.543 ± 0.003	ND	0.363	0.475	0.547	0.636	0.726	0.788
Chloroform	µg/m^3	Urban	22,218	88%	0.243 ± 0.016	ND	ND	0.094	0.129	0.205	0.398	0.630
	µg/m^3	Rural	5,942	56%	0.062 ± 0.002	ND	ND	ND	0.049	0.098	0.134	0.228
	µg/m^3	All Sites	28,160	82%	0.205 ± 0.013	ND	ND	0.076	0.110	0.187	0.342	0.543

Table 3. NATTS Network Assessment Data (2003-2022) - National Distribution Statistics By Type[a]

Analyte	Units	Site Type	# Data Records	% Detections	Arithmetic Mean[b]	Percentile Value[c]						
						5th	10th	25th	50th	75th	90th	95th
Formaldehyde	µg/m^3	Urban	22,024	100%	3.03 ± 0.04	0.69	1.00	1.57	2.42	3.72	5.47	6.95
	µg/m^3	Rural	6,432	100%	2.16 ± 0.04	0.49	0.64	1.03	1.67	2.69	4.12	5.34
	µg/m^3	All Sites	28,456	100%	2.83 ± 0.03	0.61	0.86	1.42	2.25	3.50	5.22	6.65
Lead (PM_{10})	ng/m^3	Urban	21,955	100%	3.97 ± 0.10	0.70	0.95	1.46	2.49	4.34	7.87	11.16
	ng/m^3	Rural	6,066	99%	1.93 ± 0.14	0.34	0.45	0.75	1.27	2.14	3.59	4.96
	ng/m^3	All Sites	28,021	100%	3.53 ± 0.09	0.53	0.75	1.22	2.17	3.88	6.99	10.10
Manganese (PM_{10})	ng/m^3	Urban	21,906	100%	9.76 ± 0.25	1.06	1.49	2.53	4.96	10.43	20.40	30.79
	ng/m^3	Rural	6,067	99%	3.79 ± 0.12	0.48	0.74	1.34	2.48	4.49	8.08	11.64
	ng/m^3	All Sites	27,973	100%	8.47 ± 0.20	0.84	1.22	2.16	4.19	8.99	18.13	27.27
Naphthalene	ng/m^3	Urban	17,811	100%	67.25 ± 0.97	13.42	18.03	28.73	49.00	84.13	136.42	180.00
	ng/m^3	Rural	4,732	98%	21.76 ± 1.02	2.79	4.04	6.84	12.47	23.51	45.68	69.01
	ng/m^3	All Sites	22,543	100%	57.70 ± 0.83	5.92	9.77	20.41	40.15	74.11	124.40	167.26
Nickel (PM_{10})	ng/m^3	Urban	21,958	98%	1.76 ± 0.05	0.29	0.40	0.62	1.02	1.86	3.32	5.05
	ng/m^3	Rural	5,989	85%	0.56 ± 0.07	ND	ND	0.10	0.26	0.53	0.96	1.63
	ng/m^3	All Sites	27,947	95%	1.50 ± 0.04	0.00	0.17	0.45	0.84	1.59	2.92	4.47
Tetrachloroethylene	µg/m^3	Urban	22,209	84%	0.24 ± 0.05	ND	ND	0.05	0.12	0.22	0.43	0.68
	µg/m^3	Rural	5,936	38%	0.07 ± 0.02	ND	ND	ND	ND	0.04	0.12	0.31
	µg/m^3	All Sites	28,145	75%	0.21 ± 0.04	ND	ND	ND	0.08	0.20	0.38	0.61
Trichloroethylene	µg/m^3	Urban	22,204	43%	0.040 ± 0.008	ND	ND	ND	ND	0.043	0.096	0.152
	µg/m^3	Rural	5,922	19%	0.019 ± 0.003	ND	ND	ND	ND	ND	0.029	0.124
	µg/m^3	All Sites	28,126	38%	0.036 ± 0.006	ND	ND	ND	ND	0.033	0.085	0.148
Vinyl Chloride	µg/m^3	Urban	22,021	18%	0.0046 ± 0.0003	ND	ND	ND	ND	ND	0.0126	0.0251
	µg/m^3	Rural	5,940	13%	0.0070 ± 0.0008	ND	ND	ND	ND	ND	0.0125	0.0304
	µg/m^3	All Sites	27,961	17%	0.0051 ± 0.0003	ND	ND	ND	ND	ND	0.0126	0.0253

[a] Statistics presented are from pollutant datasets which were suitable for trends.

[b] The arithmetic mean is the average of all samples results which include actual measured values. If no chemical was registered, then a value of zero is used when calculating the mean.

[c] ND: No results of this chemical were registered by the laboratory analytical equipment.

Table 4. Summary Statistics for Tampa, FL

Analyte	Units	# Data Records	% Detection	Arithmetic Mean[a]	Percentile Value[b]						
					5th	10th	25th	50th	75th	90th	95th
Acetaldehyde	µg/m^3	1,113	100%	1.33 ± 0.06	0.56	0.66	0.85	1.13	1.53	2.07	2.55
Arsenic (PM_{10})	ng/m^3	1,138	100%	1.17 ± 0.06	0.23	0.33	0.58	0.89	1.41	2.33	3.17
Benzene	µg/m^3	1,149	100%	0.41 ± 0.01	0.18	0.20	0.26	0.37	0.50	0.69	0.83
Benzo(a)pyrene	ng/m^3	886	39%	0.06 ± 0.01	ND	ND	ND	ND	0.06	0.20	0.31
Beryllium (PM_{10})	ng/m^3	1,139	90%	0.029 ± 0.003	ND	ND	0.002	0.01	0.04	0.08	0.10
Butadiene, 1,3-	µg/m^3	1,149	95%	0.052 ± 0.003	0.01	0.02	0.03	0.04	0.07	0.11	0.13
Cadmium (PM_{10})	ng/m^3	1,146	99%	0.15 ± 0.01	0.03	0.05	0.07	0.09	0.17	0.25	0.38
Carbon Tetrachloride	µg/m^3	1,149	100%	0.509 ± 0.004	0.44	0.45	0.47	0.50	0.53	0.58	0.62
Chloroform	µg/m^3	1,148	100%	0.14 ± 0.01	0.08	0.08	0.10	0.12	0.15	0.19	0.24
Formaldehyde	µg/m^3	1,114	100%	2.32 ± 0.10	0.91	1.15	1.53	2.05	2.71	3.49	4.15
Lead (PM_{10})	ng/m^3	1,146	100%	2.08 ± 0.12	0.57	0.74	1.06	1.57	2.43	3.64	5.12
Manganese (PM_{10})	ng/m^3	1,146	100%	2.73 ± 0.15	0.78	0.96	1.32	2.01	2.95	5.04	7.35
Naphthalene	ng/m^3	885	100%	25.51 ± 2.46	5.31	7.31	11.33	18.54	29.70	49.11	70.43
Nickel (PM_{10})	ng/m^3	1,146	99%	2.04 ± 0.11	0.43	0.53	0.76	1.35	2.67	4.43	5.74
Tetrachloroethylene	µg/m^3	1,148	88%	0.065 ± 0.004	ND	ND	0.03	0.05	0.08	0.14	0.16
Trichloroethylene	µg/m^3	1,147	21%	0.009 ± 0.001	ND	ND	ND	ND	ND	0.03	0.05
Vinyl Chloride	µg/m^3	1,149	14%	0.0028 ± 0.0005	ND	ND	ND	ND	ND	0.01	0.02

[a] :The arithmetic mean is the average of all samples results which included actual measured values. If no chemical was registered, then a value of zero is used.

[b] ND: No results of this chemical were registered by the laboratory analytical equipment.

Table 5. Analytical Labs Supporting this Site

Pollutant Group	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
VOCs	PCDEM	PCDEM	PCDEM	PCDEM	PCDEM	PCDEM	PCDEM	PCDEM	PCDEM	PCDEM	PCDEM	PCDEM	PCDEM	PCDEM	PCDEM
Carbonyls	ERG	ERG	ERG	ERG	ERG	ERG	ERG	ERG	ERG	ERG	ERG	ERG	ERG	ERG	ERG
PM_{10} Metals	EPCHC	EPCHC	EPCHC	EPCHC	EPCHC	EPCHC	EPCHC	EPCHC	EPCHC	EPCHC	EPCHC	EPCHC	EPCHC	EPCHC	EPCHC
PAHs	--	--	--	--	ERG	ERG	ERG	ERG	ERG	ERG/EPCHC	EPCHC	EPCHC	EPCHC	EPCHC	EPCHC

Pollutant Group	2019	2020	2021	2022
VOCs	PCDEM	PCDEM	PCDEM	PCDEM
Carbonyls	ERG	ERG	ERG	ERG
PM_{10} Metals	EPCHC	EPCHC	EPCHC	EPCHC
PAHs	EPCHC	EPCHC	EPCHC	EPCHC

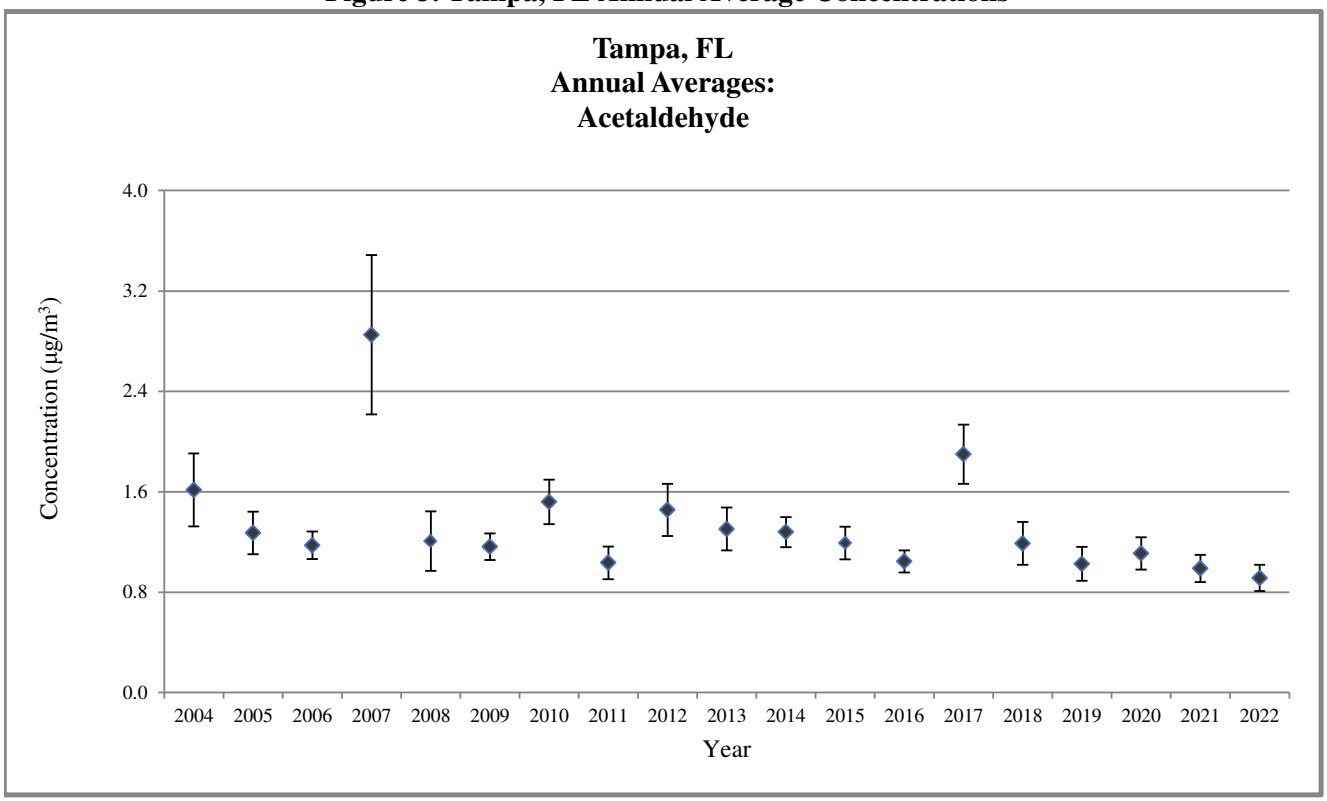
--: Not Applicable

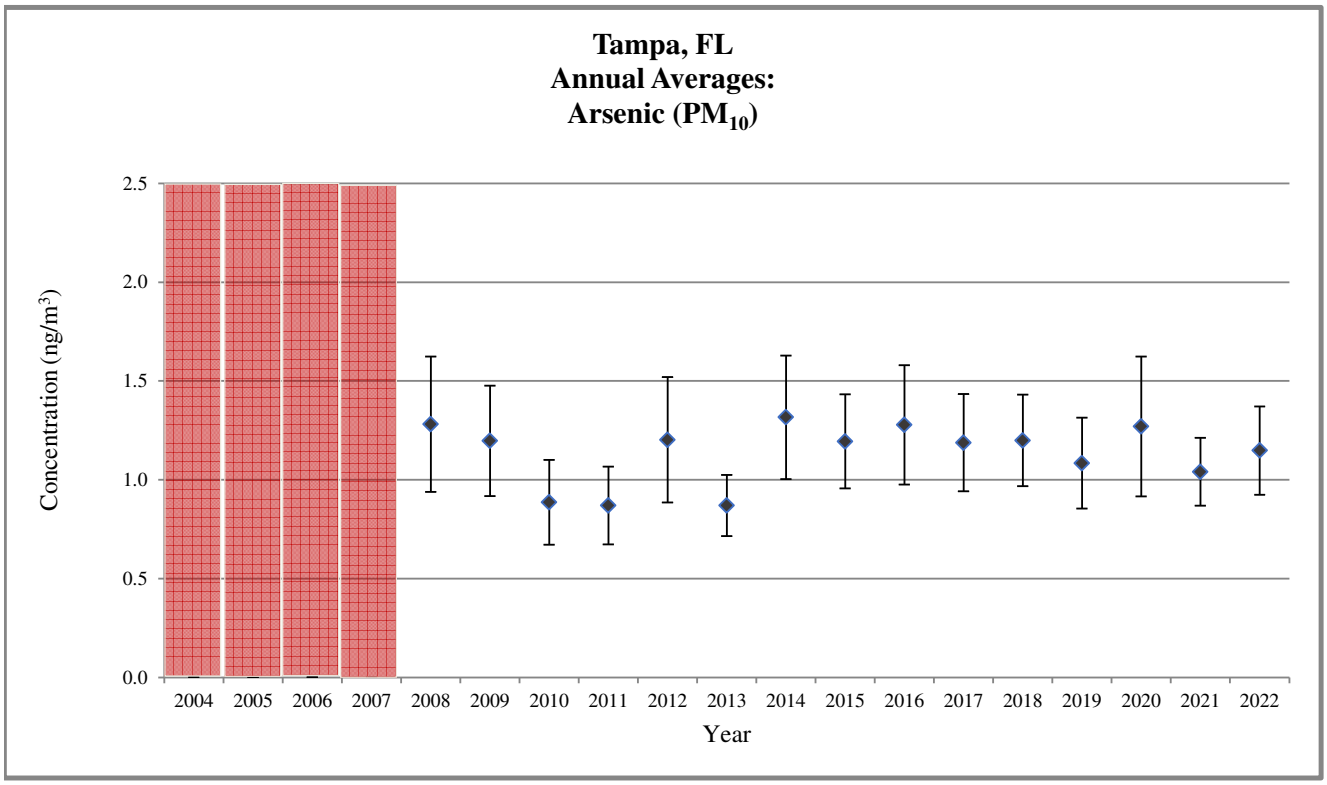
PCDEM: Pinellas County Department of Environmental Management

ERG: Eastern Research Group, Inc.

EPCHC: Environmental Protection Commission of Hillsborough County

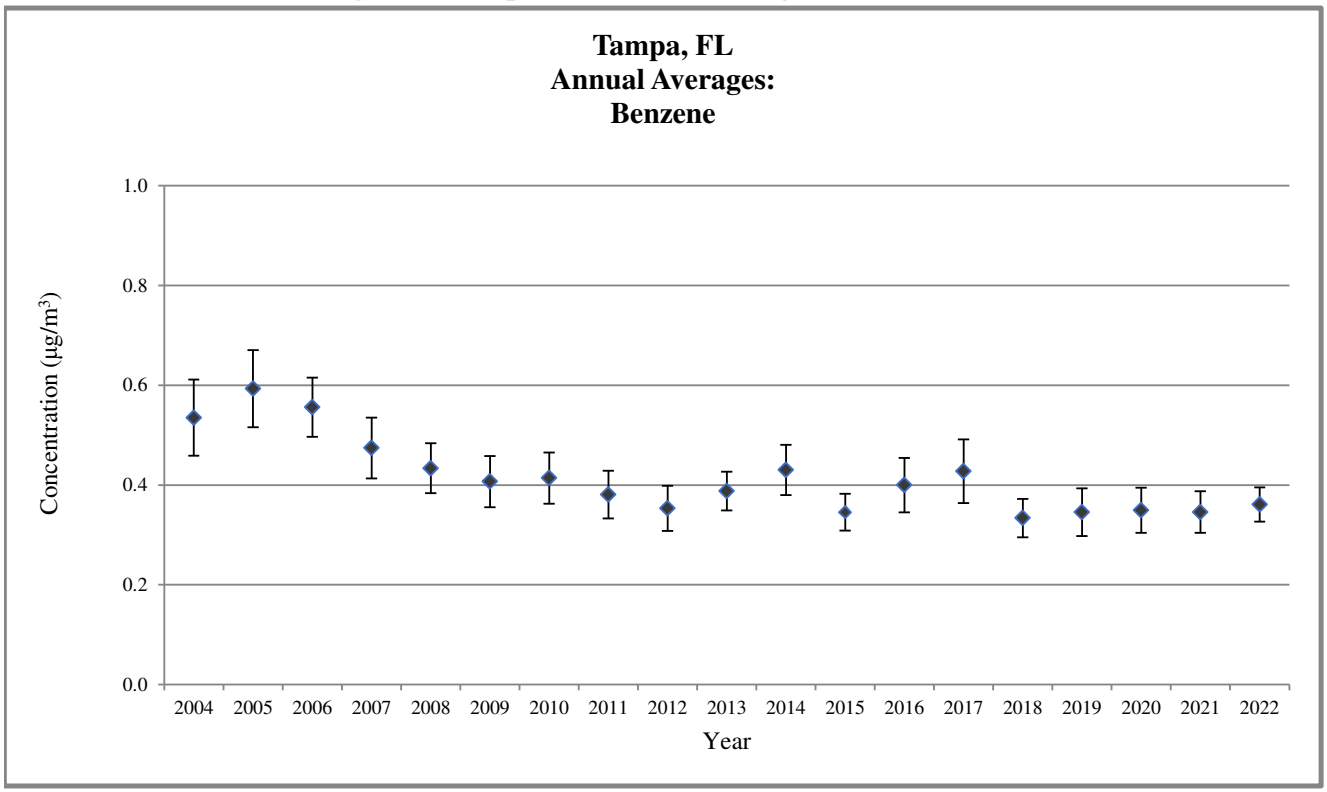
Figure 3. Tampa, FL Annual Average Concentrations

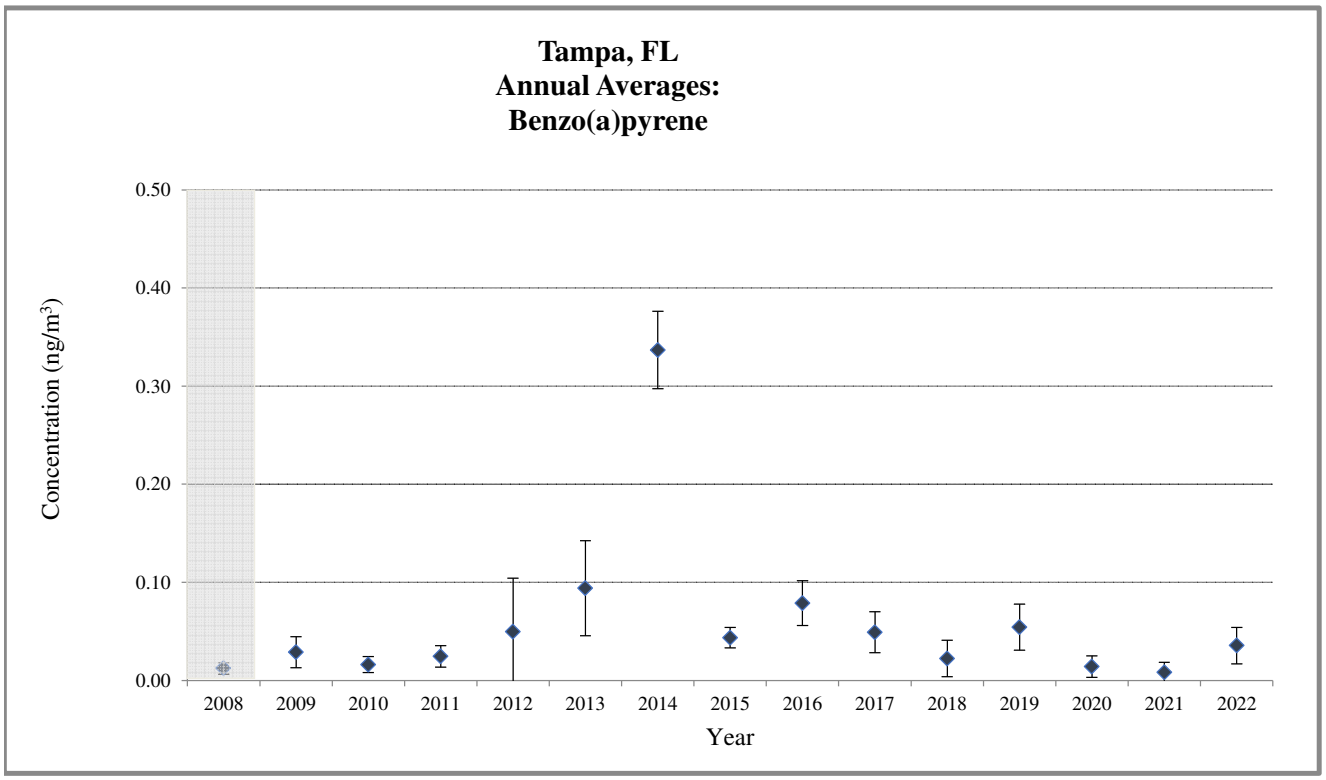




Sampling began midway through the year.
Does not meet MQO

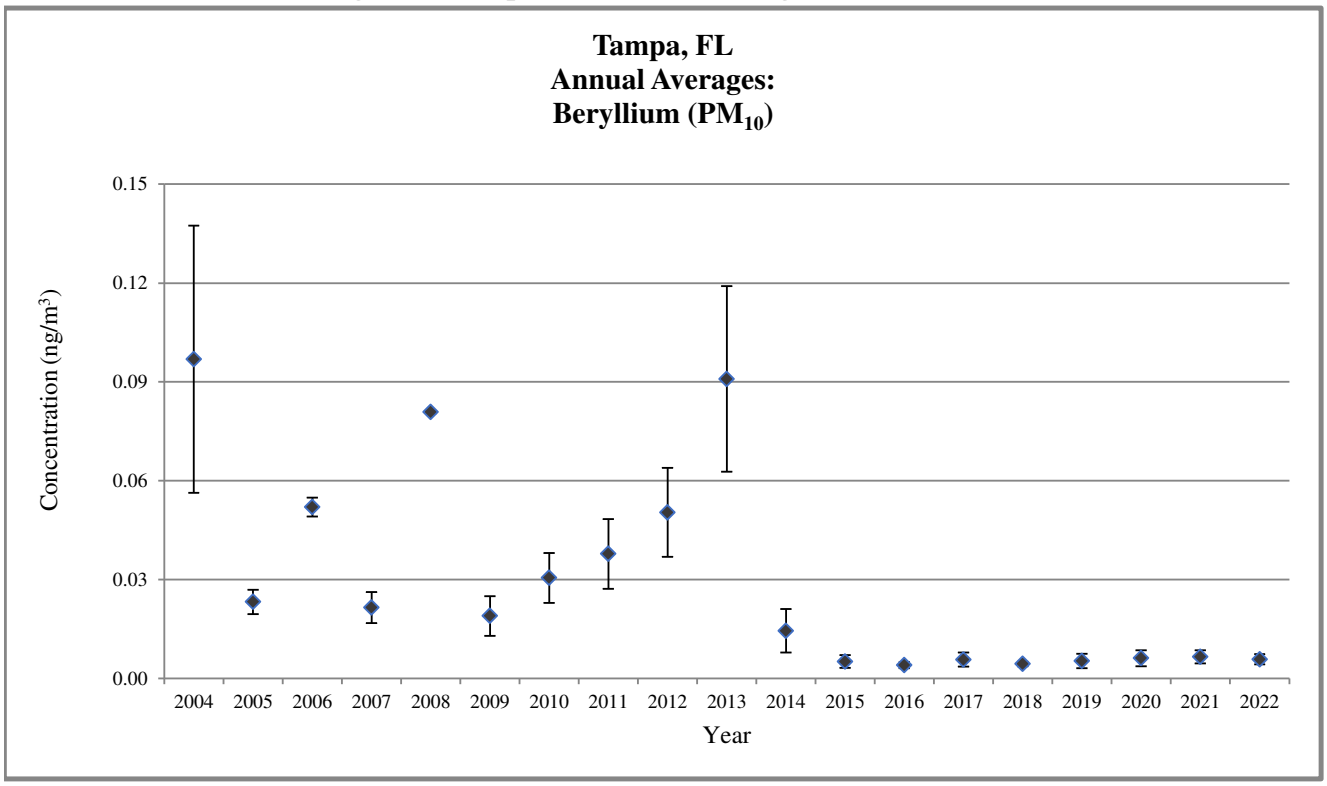
Figure 3. Tampa, FL Annual Average Concentrations

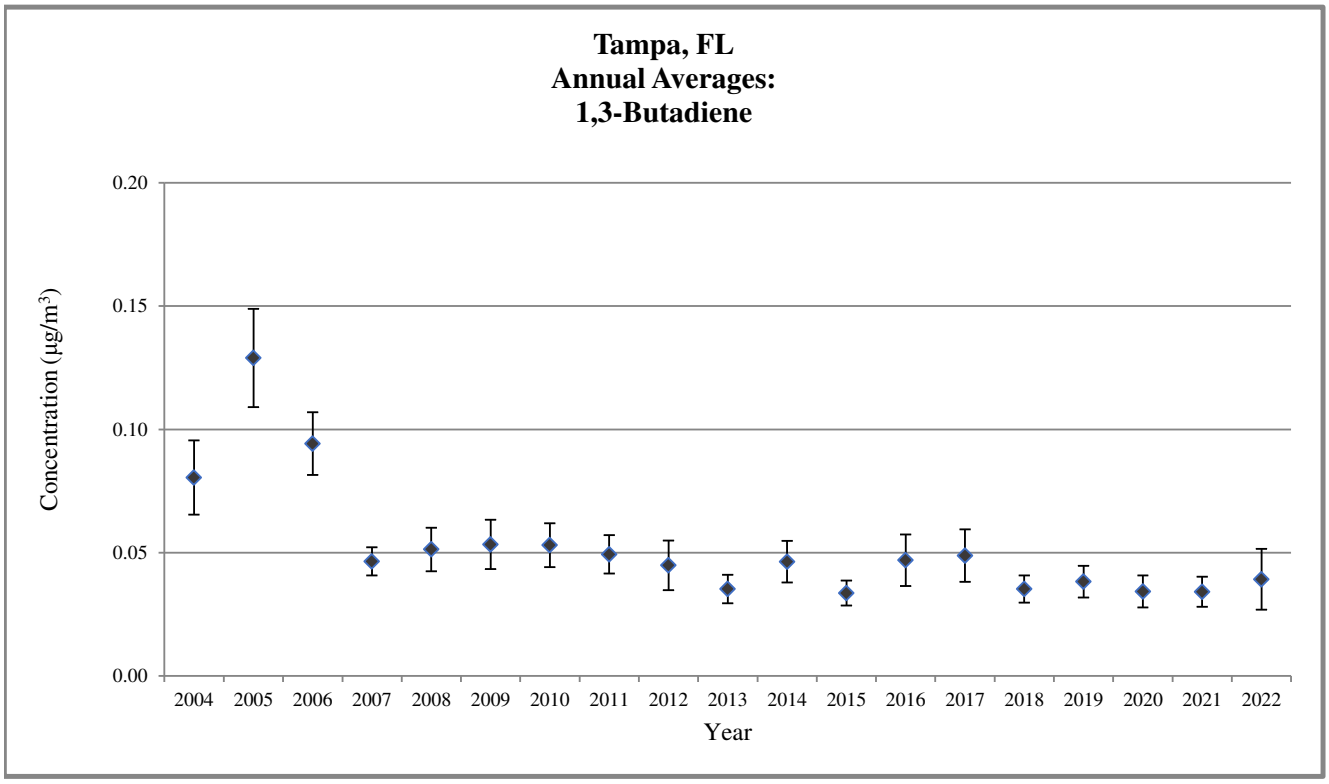




Sampling began midway through the year.
Does not meet MQO

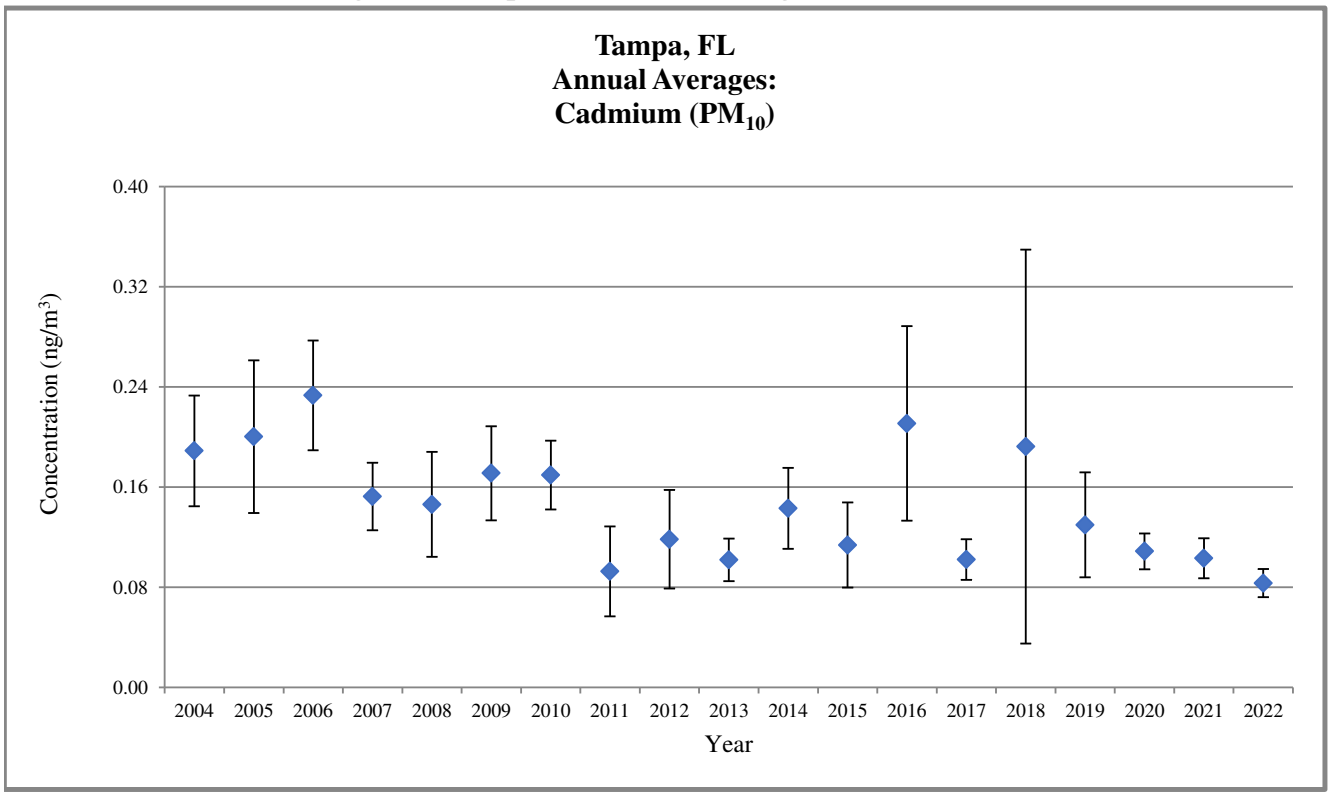
Figure 3. Tampa, FL Annual Average Concentrations

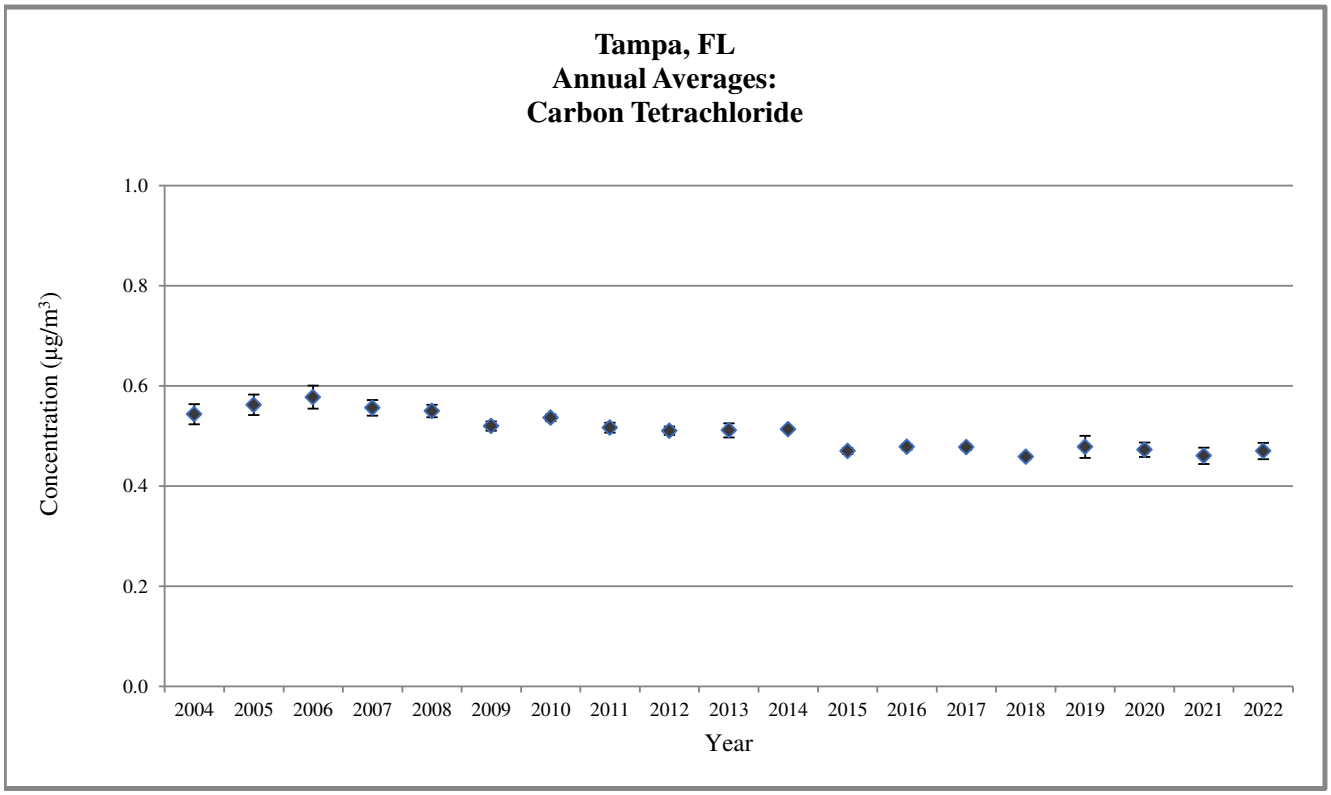




Sampling began midway through the year.
Does not meet MQO

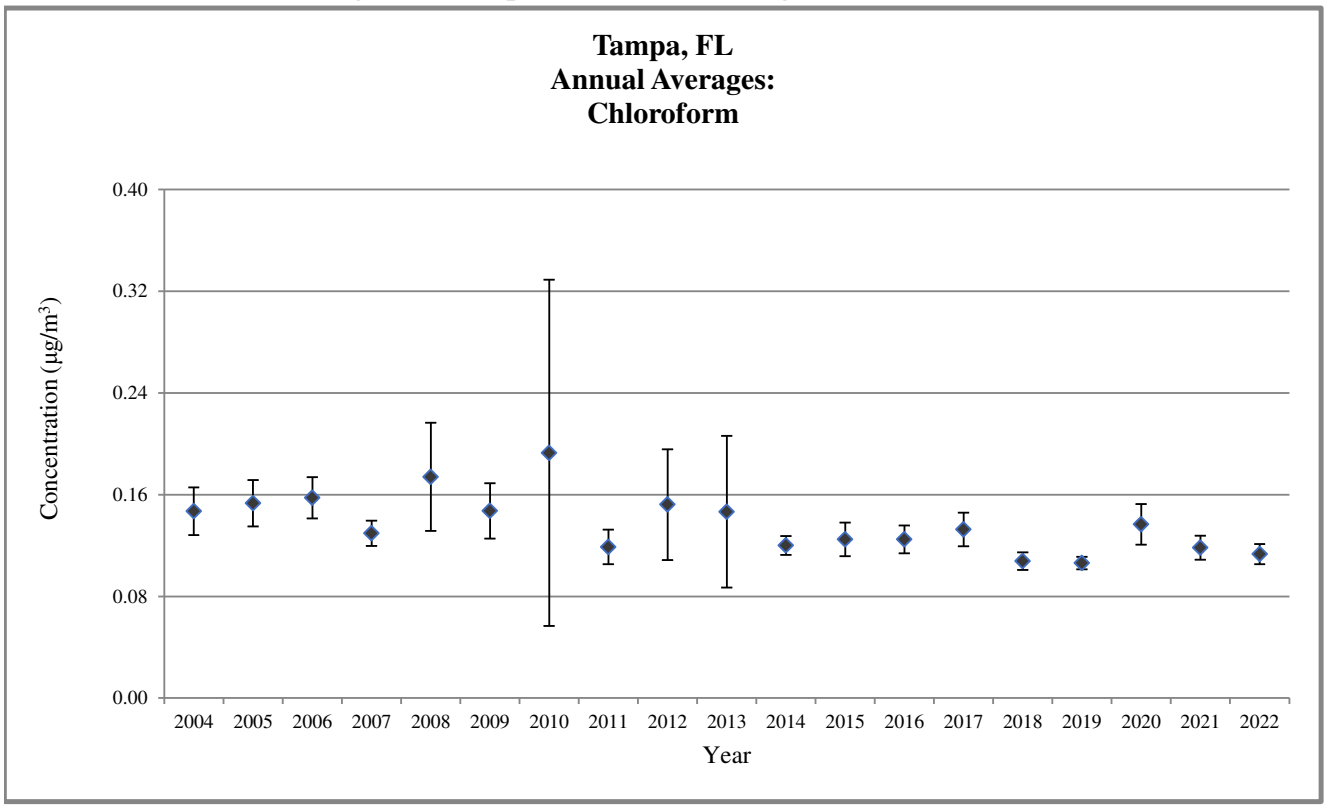
Figure 3. Tampa, FL Annual Average Concentrations

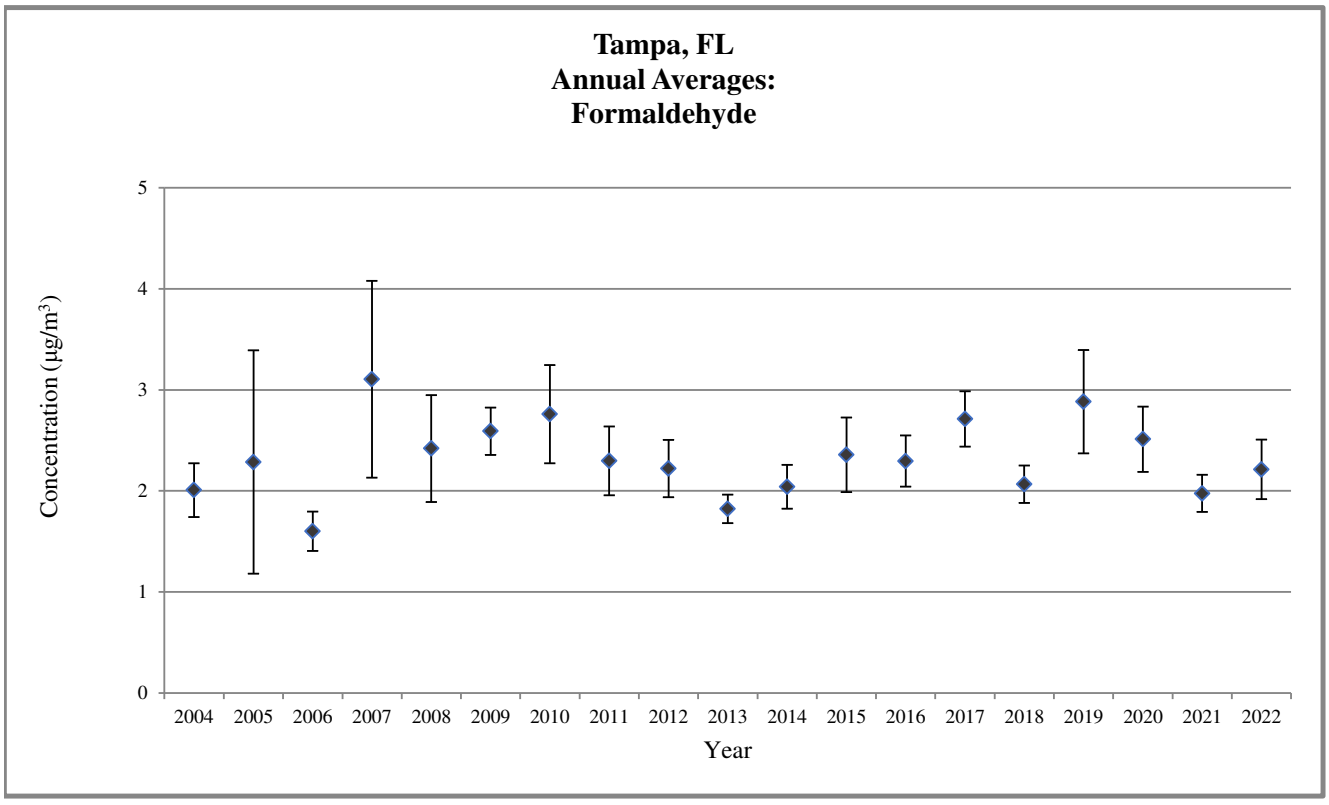




Sampling began midway through the year.
Does not meet MQO

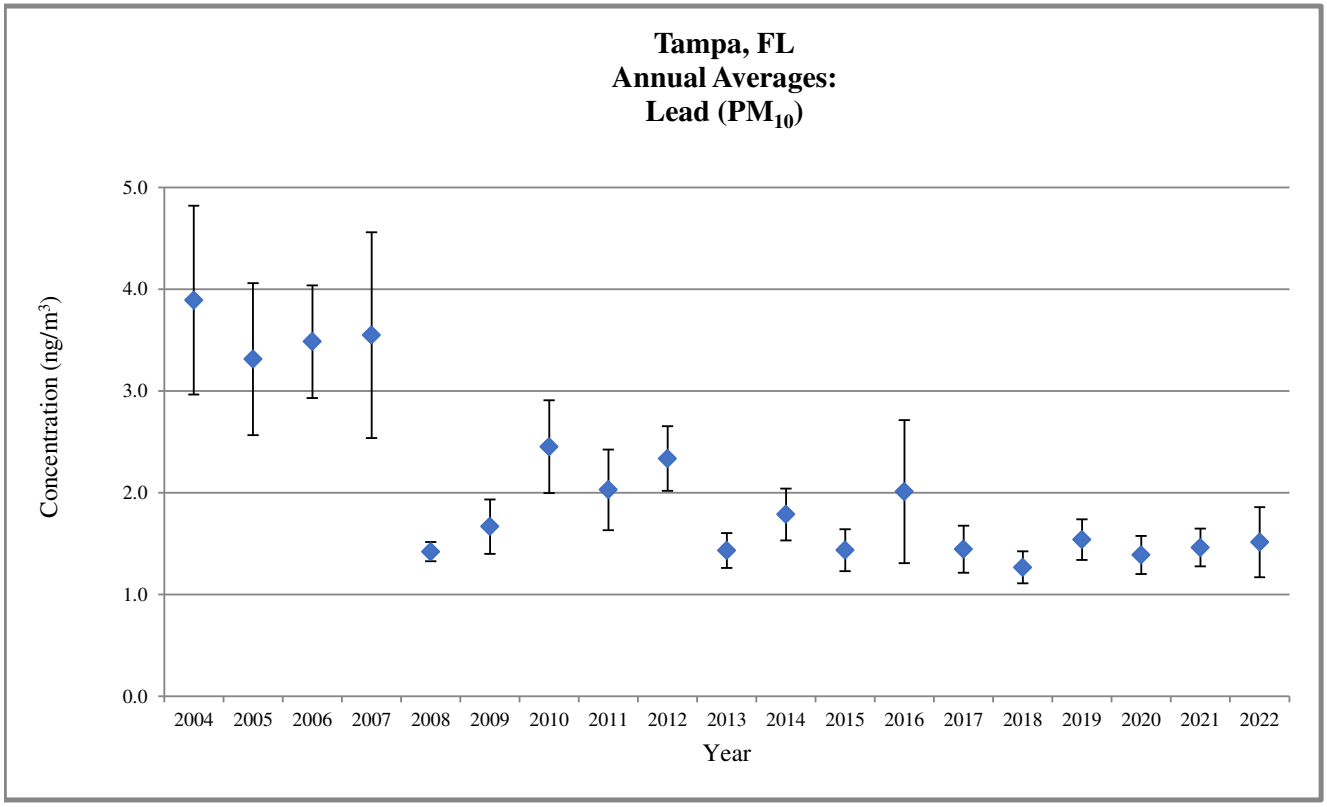
Figure 3. Tampa, FL Annual Average Concentrations

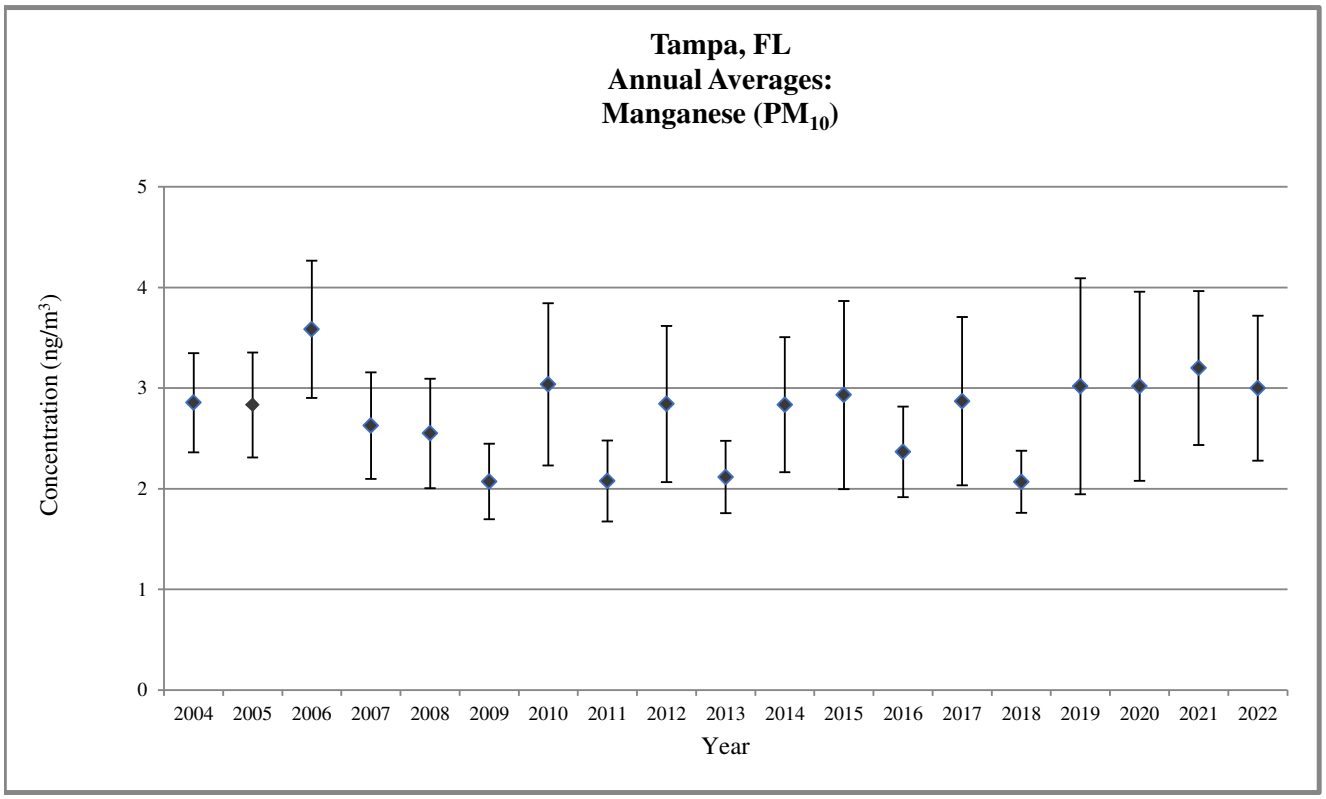




Sampling began midway through the year.
Does not meet MQO

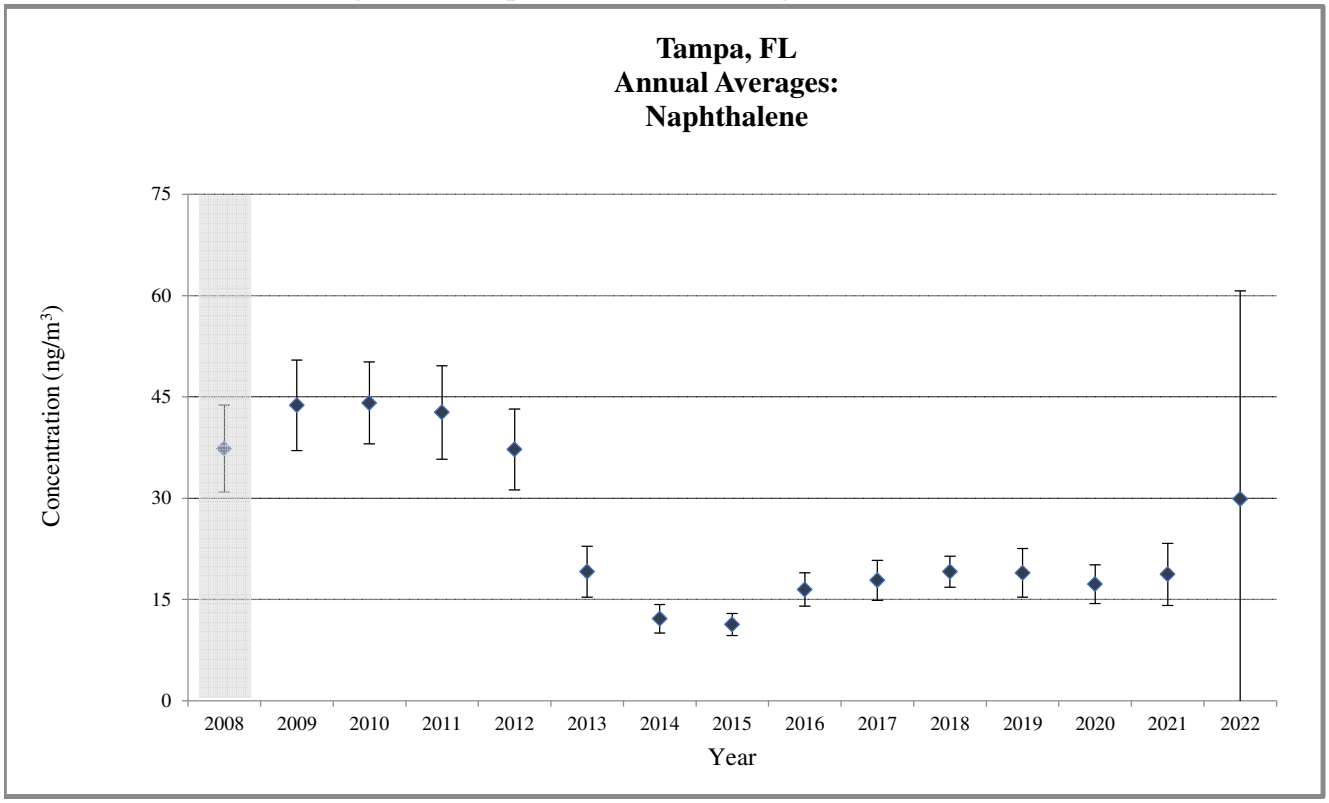
Figure 3. Tampa, FL Annual Average Concentrations

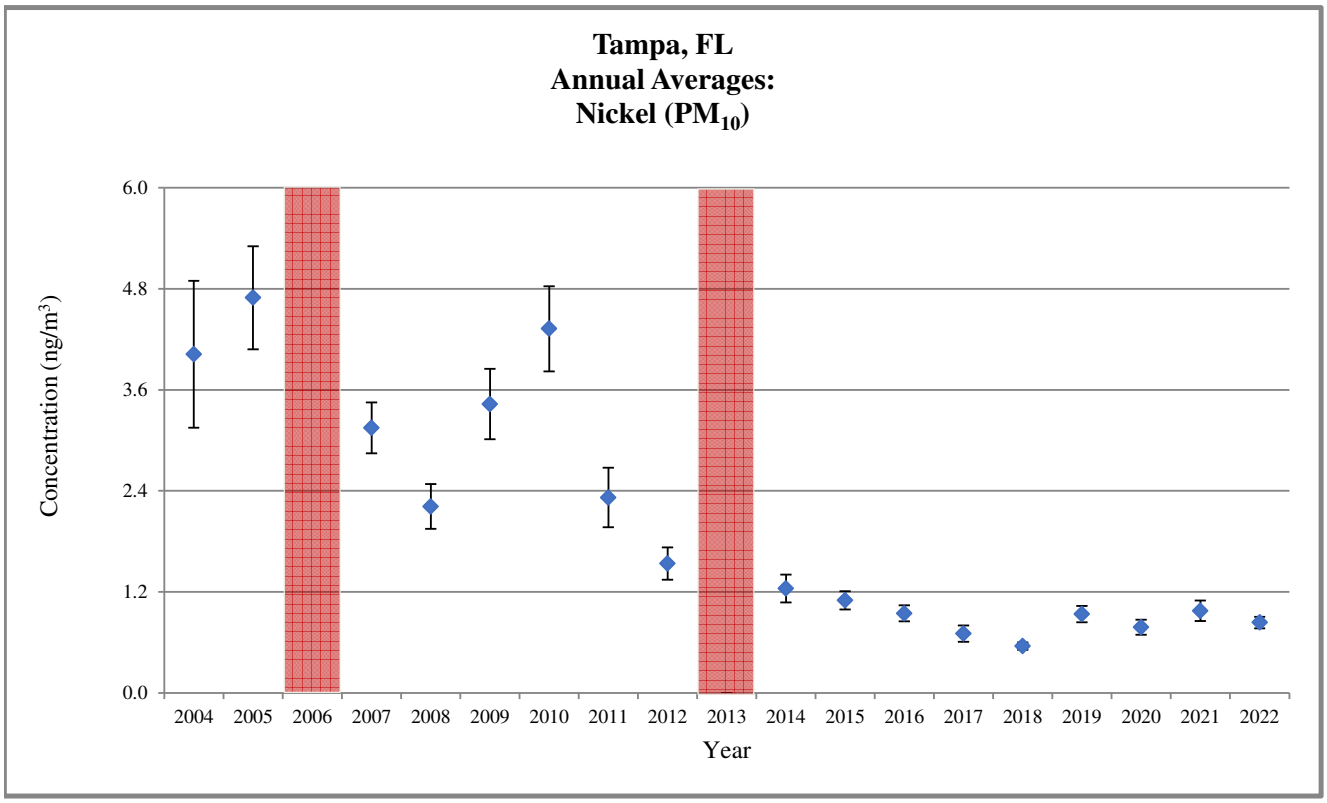




Sampling began midway through the year.
Does not meet MQO

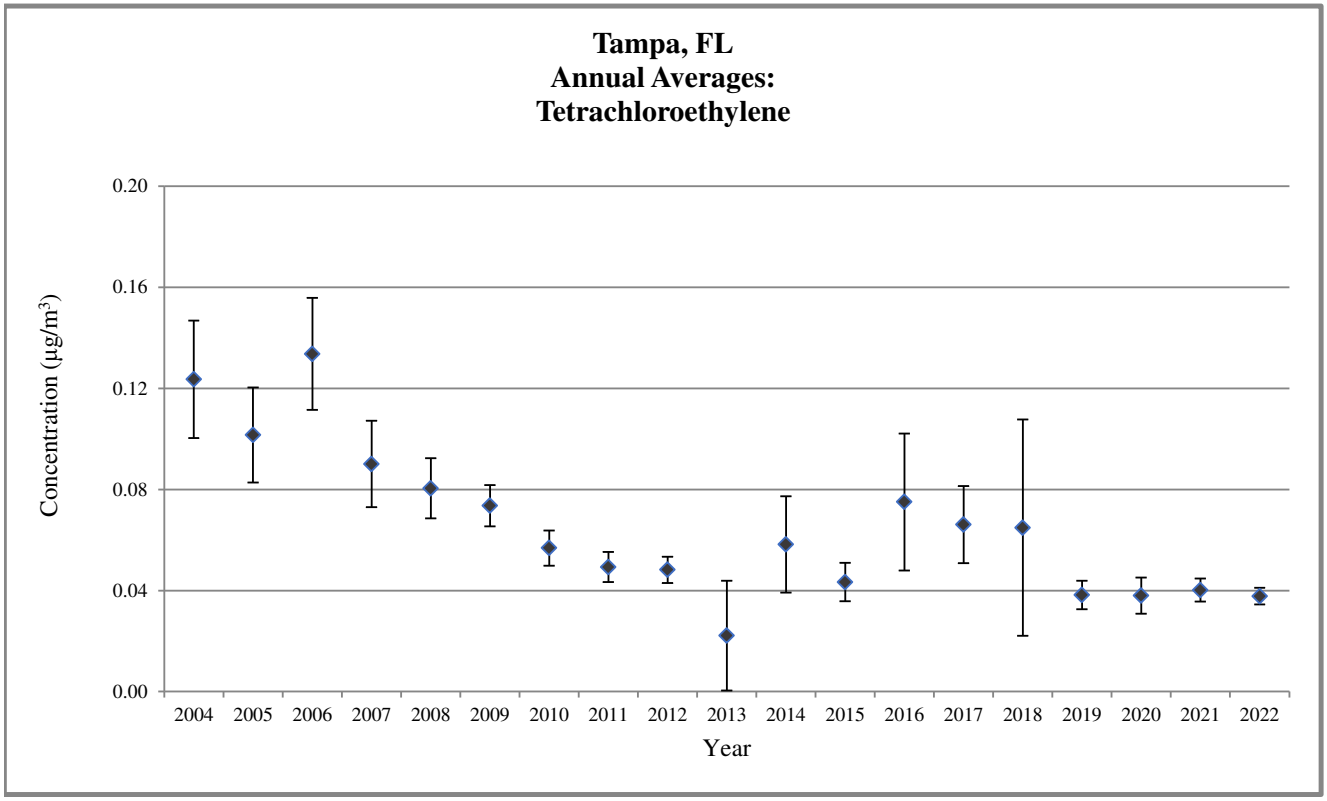
Figure 3. Tampa, FL Annual Average Concentrations

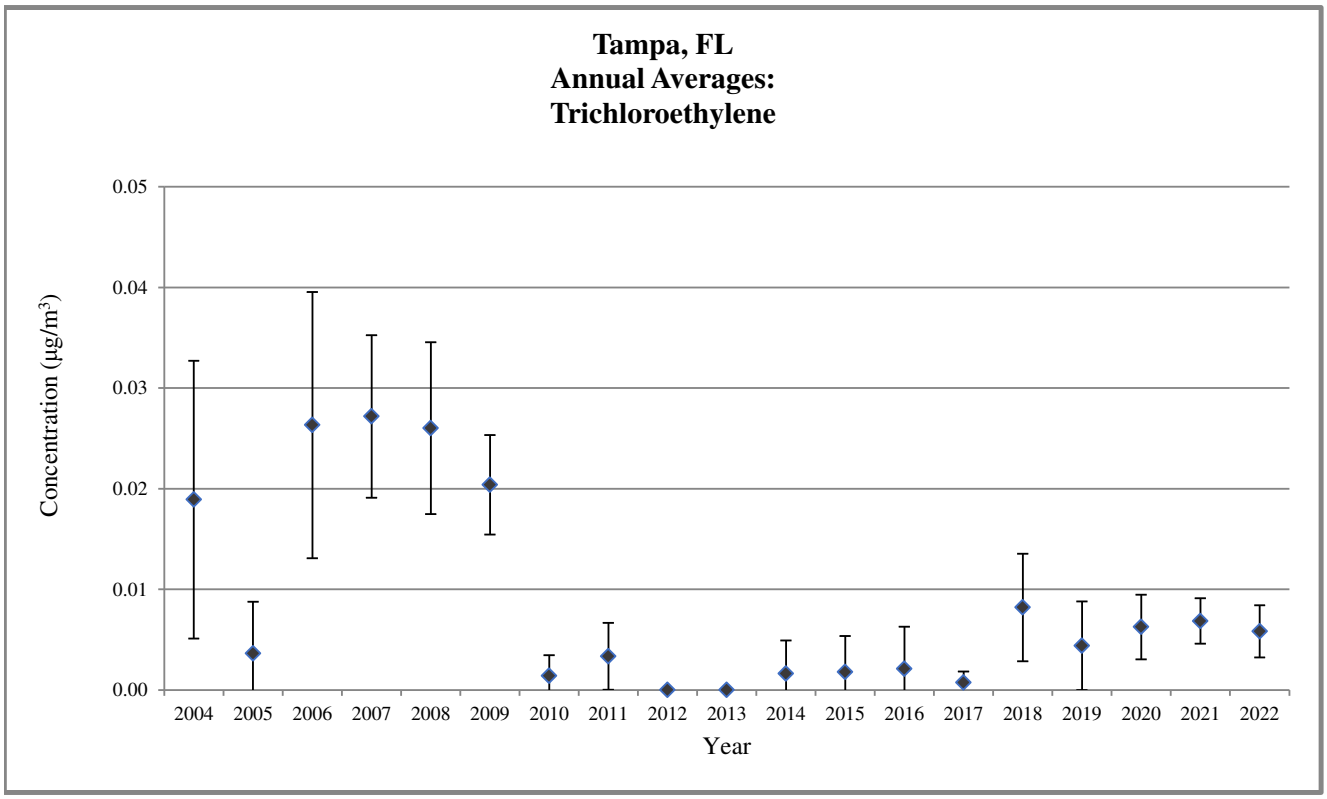




Sampling began midway through the year.
Does not meet MQO

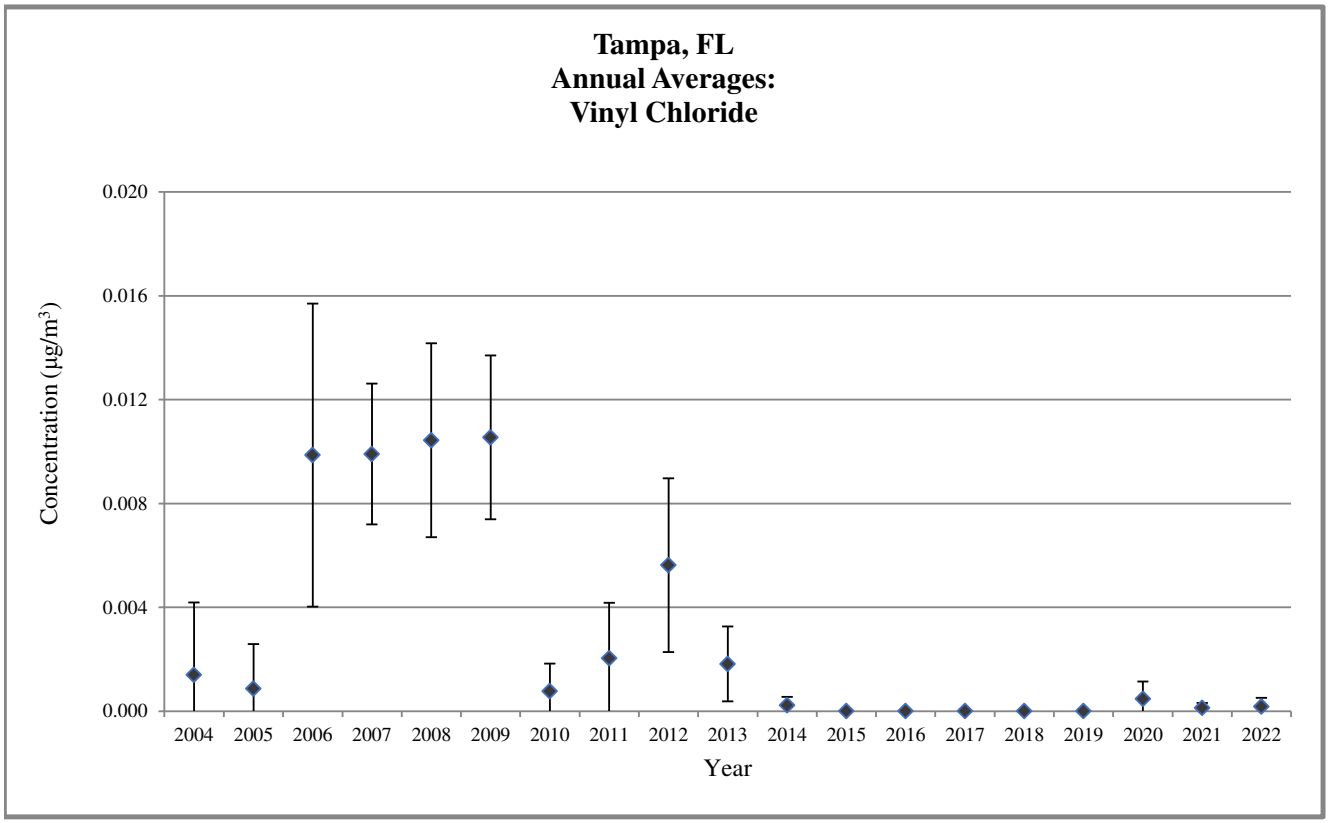
Figure 3. Tampa, FL Annual Average Concentrations





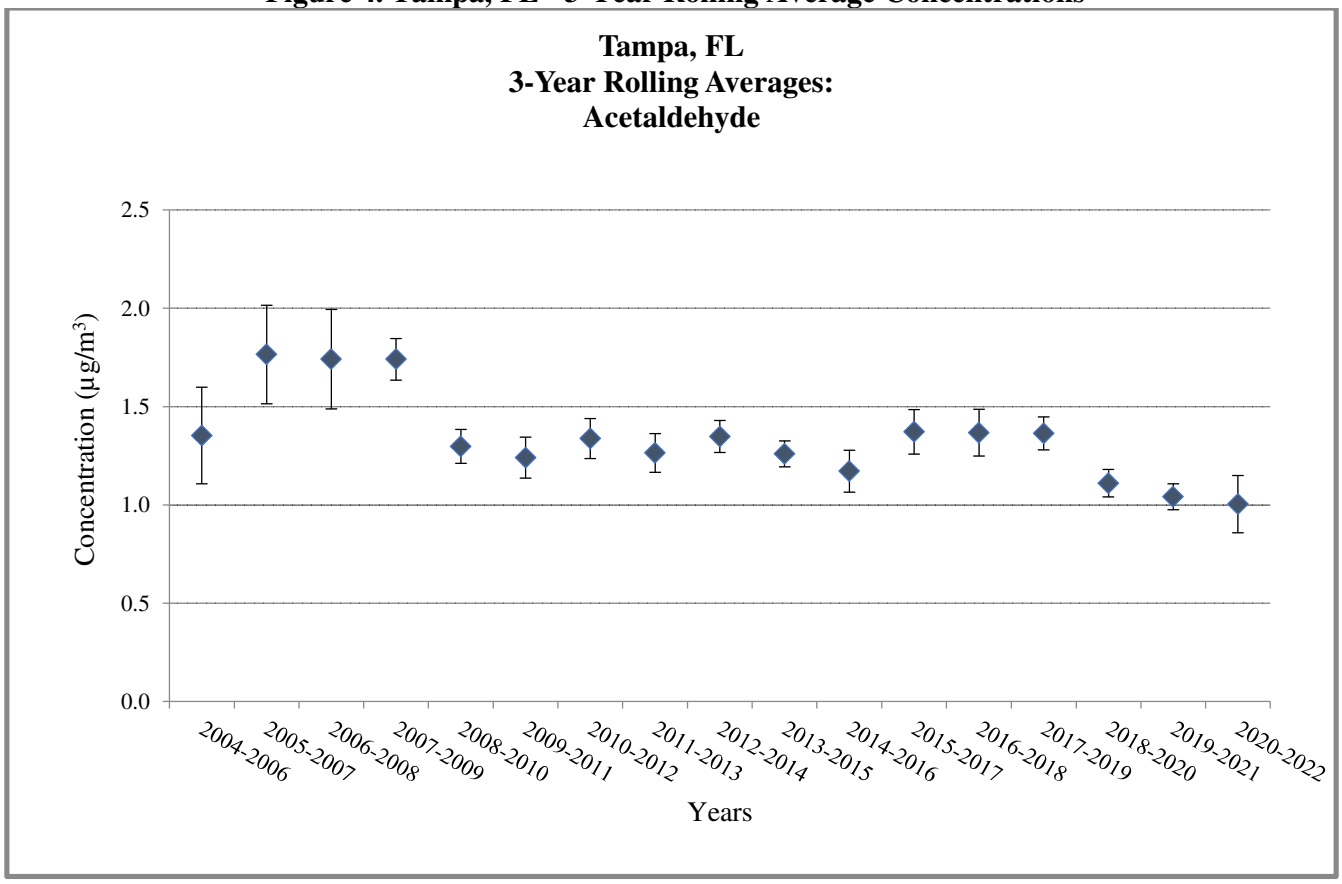
Sampling began midway through the year.
Does not meet MQO

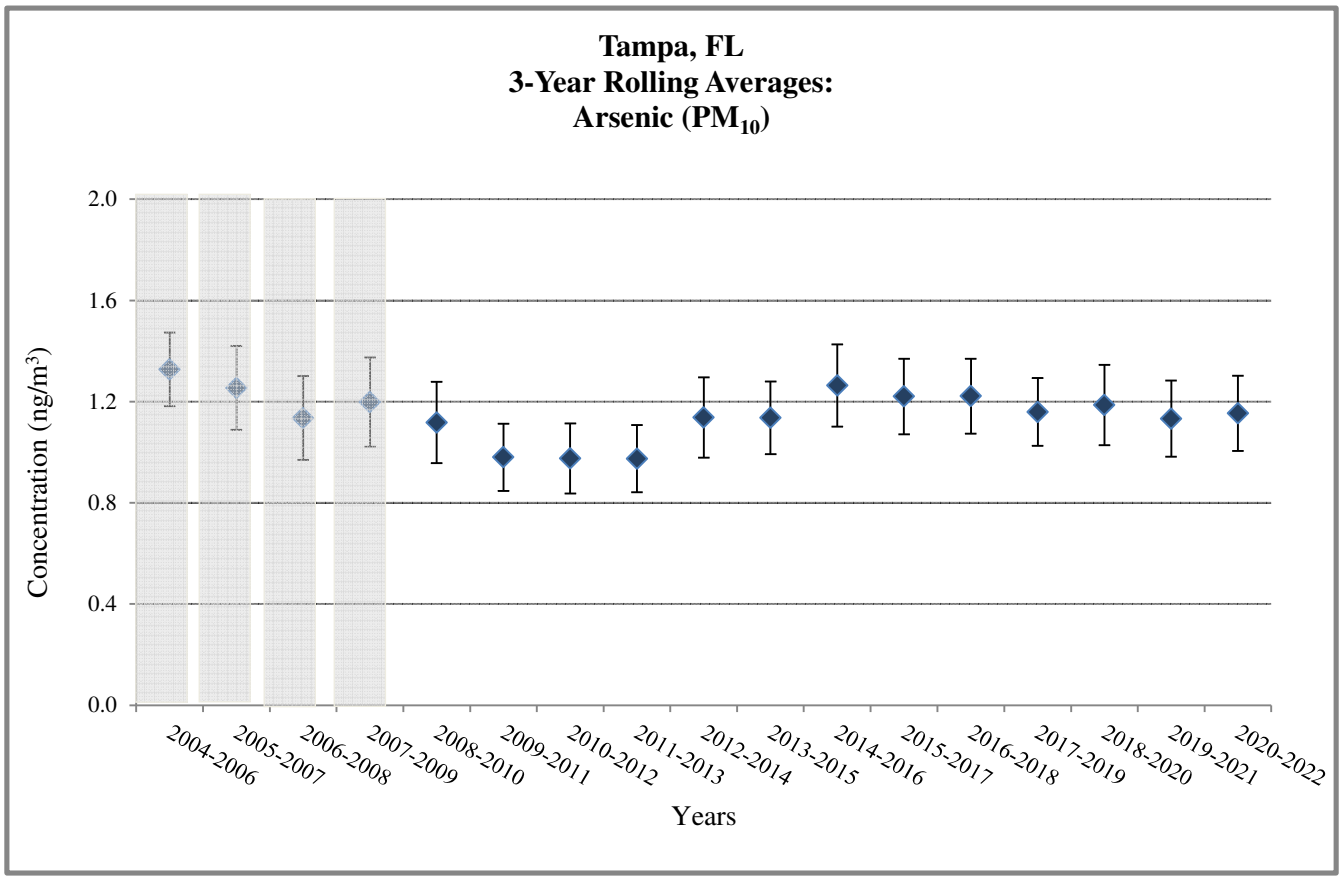
Figure 3. Tampa, FL Annual Average Concentrations



Sampling began midway through the year.
Does not meet MQO

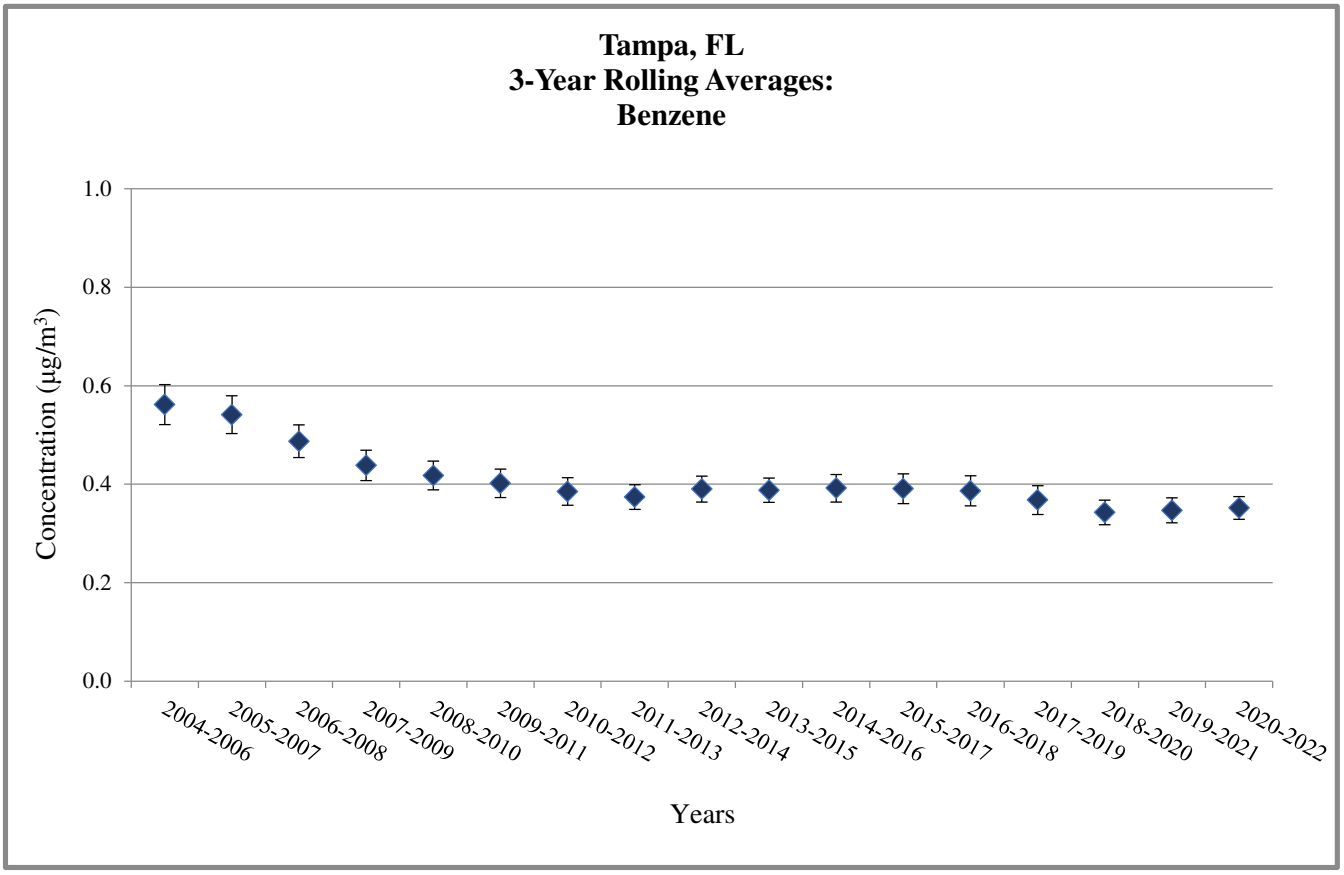
Figure 4. Tampa, FL - 3-Year Rolling Average Concentrations

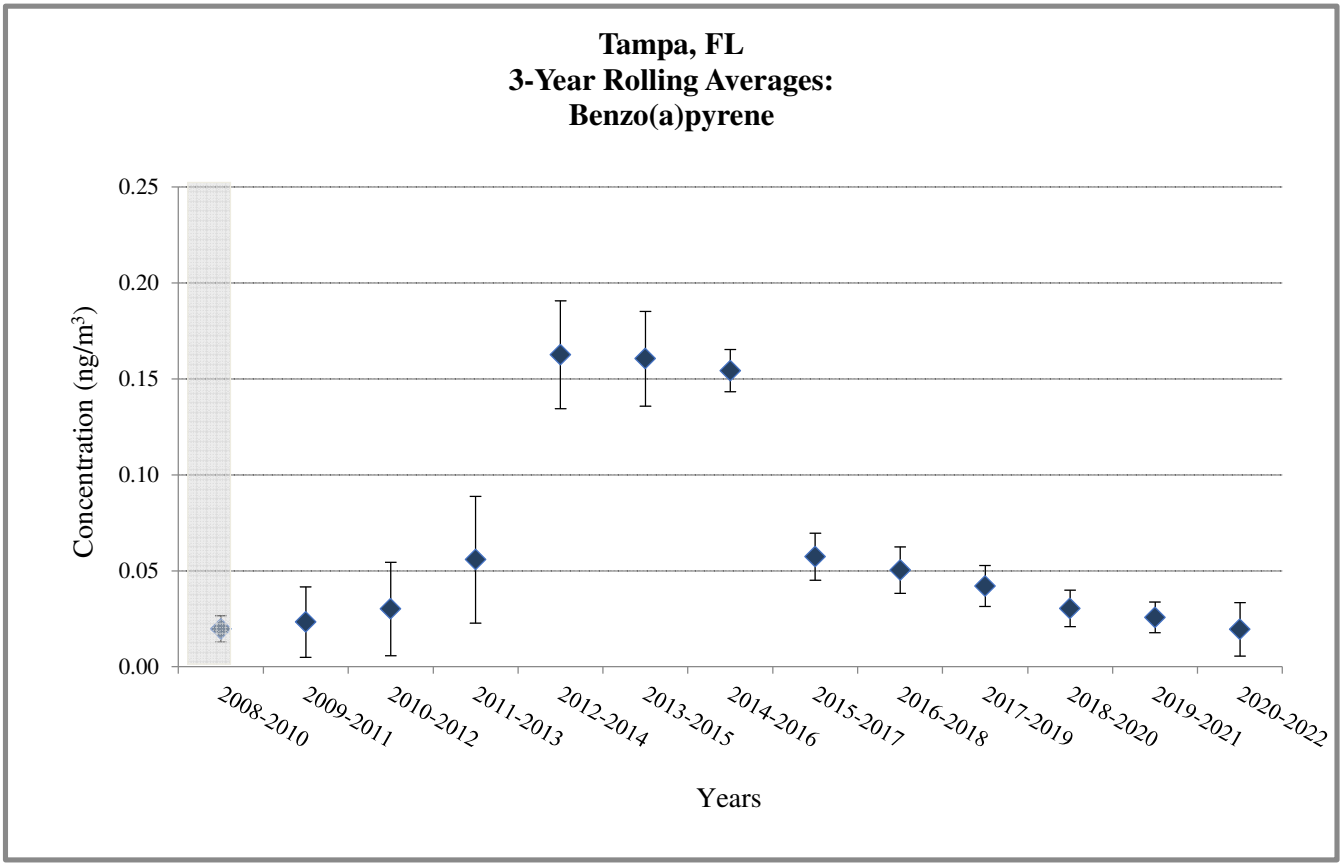




Does not meet MQO or wasn't able to collect enough samples

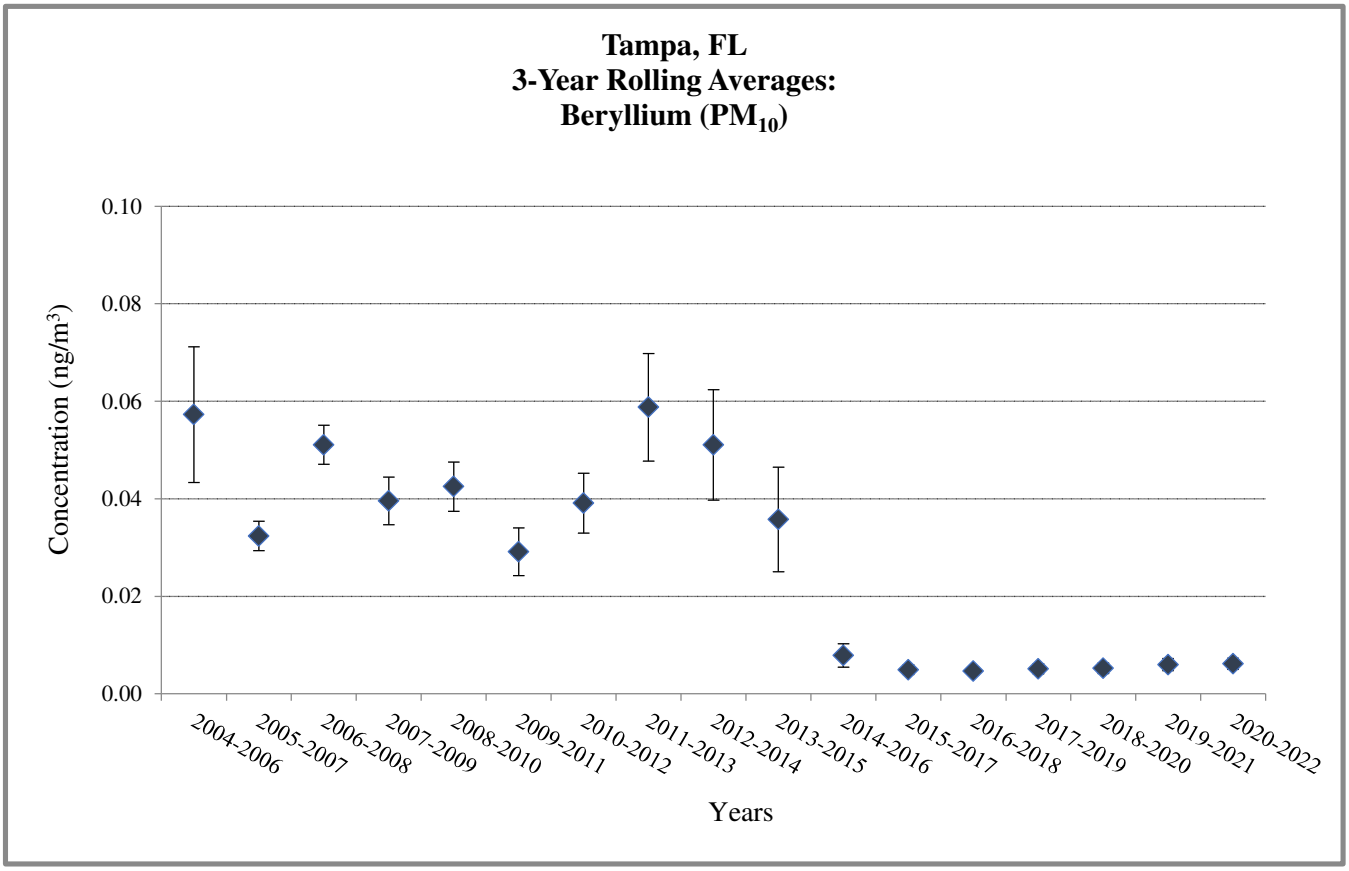
Figure 4. Tampa, FL - 3-Year Rolling Average Concentrations

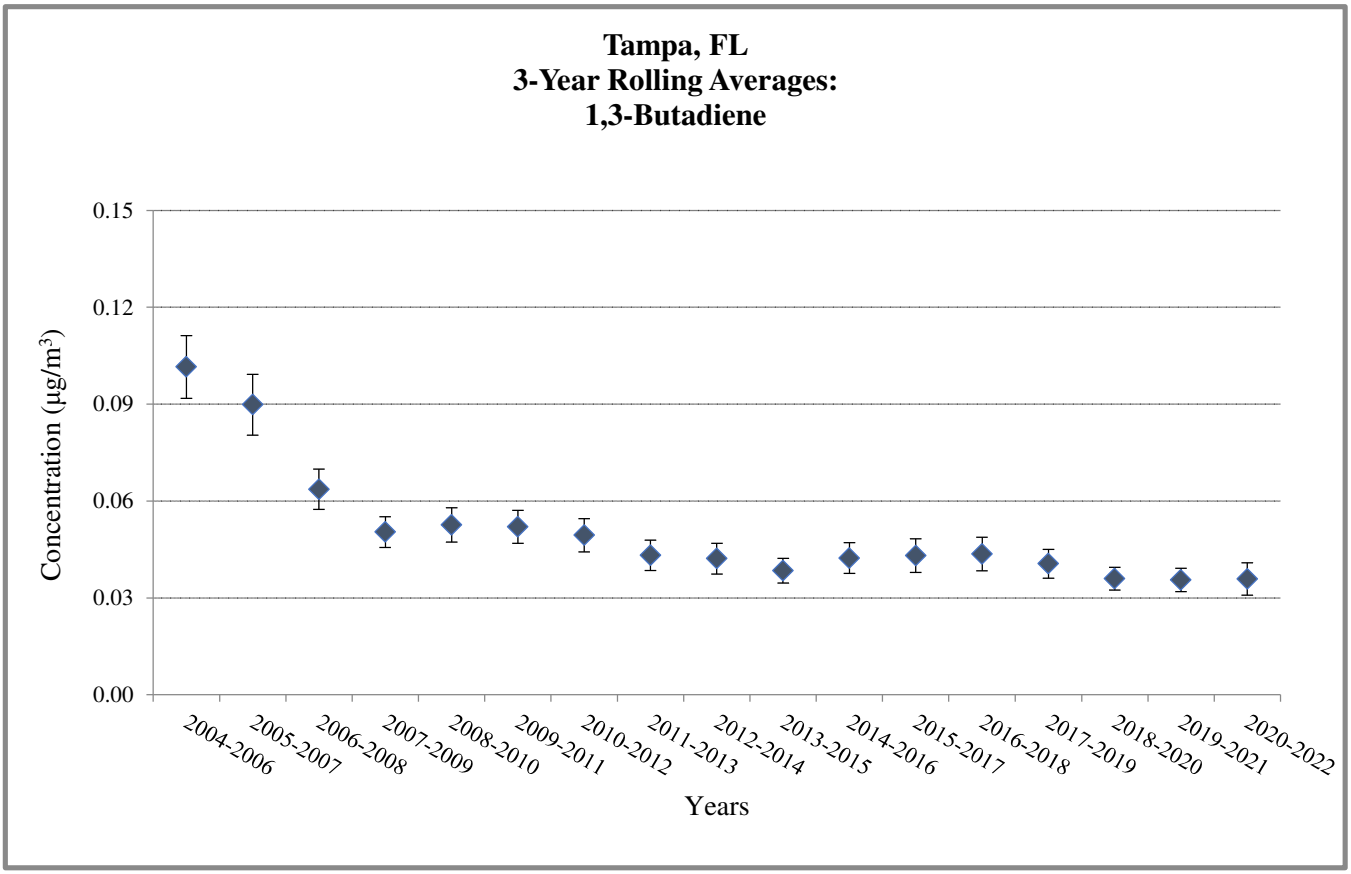




Does not meet MQO or wasn't able to collect enough samples

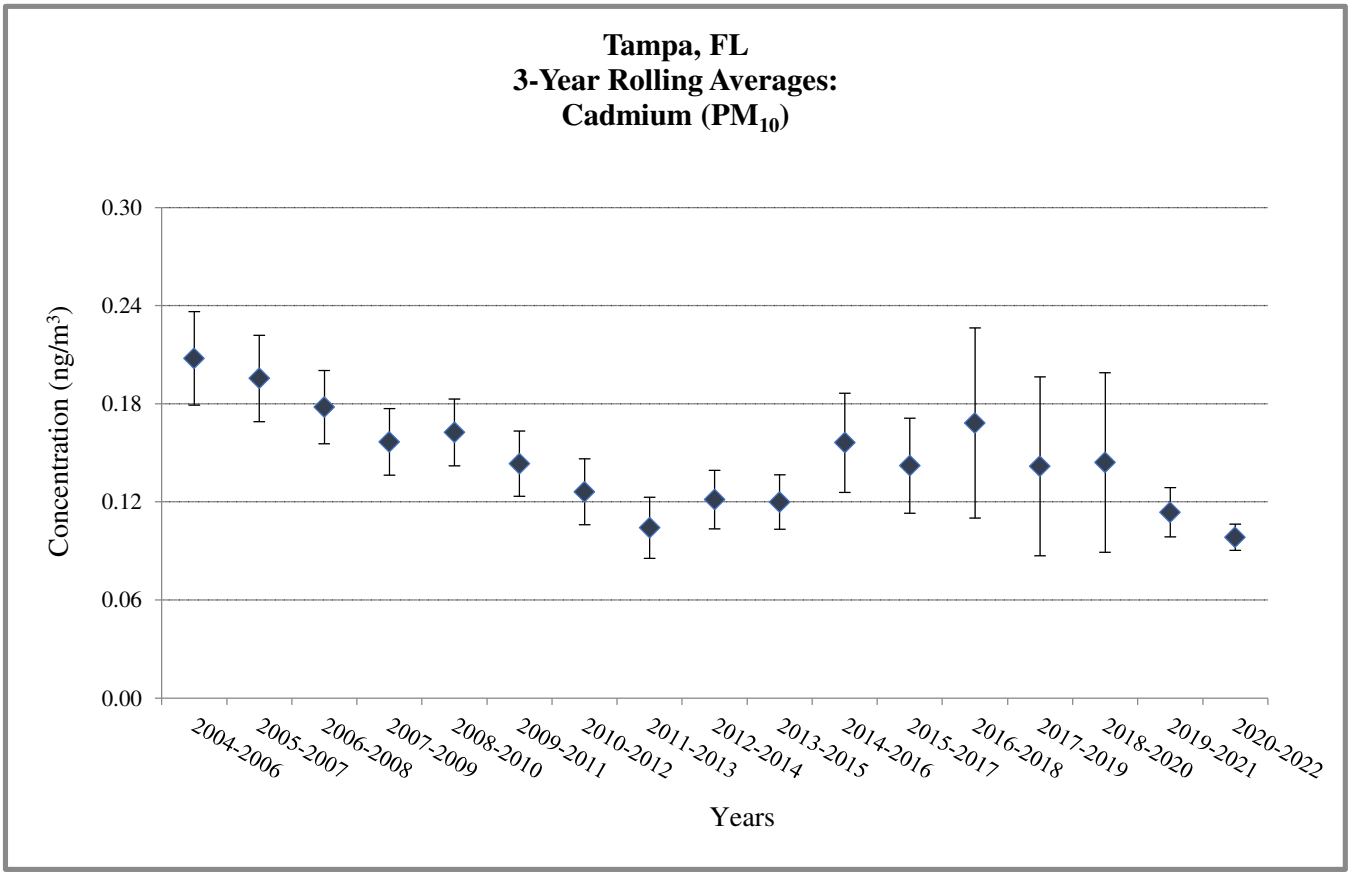
Figure 4. Tampa, FL - 3-Year Rolling Average Concentrations

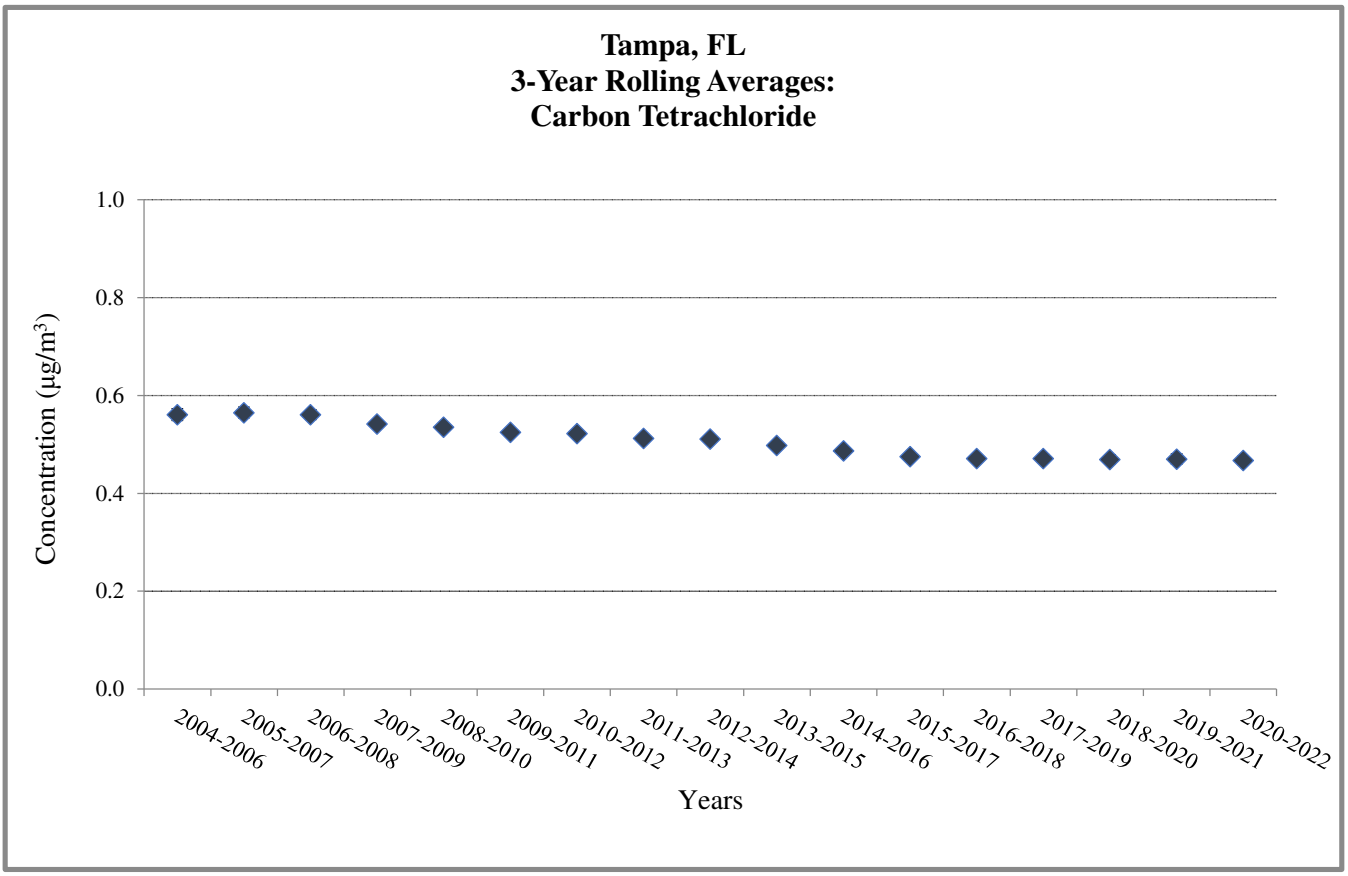




Does not meet MQO or wasn't able to collect enough samples

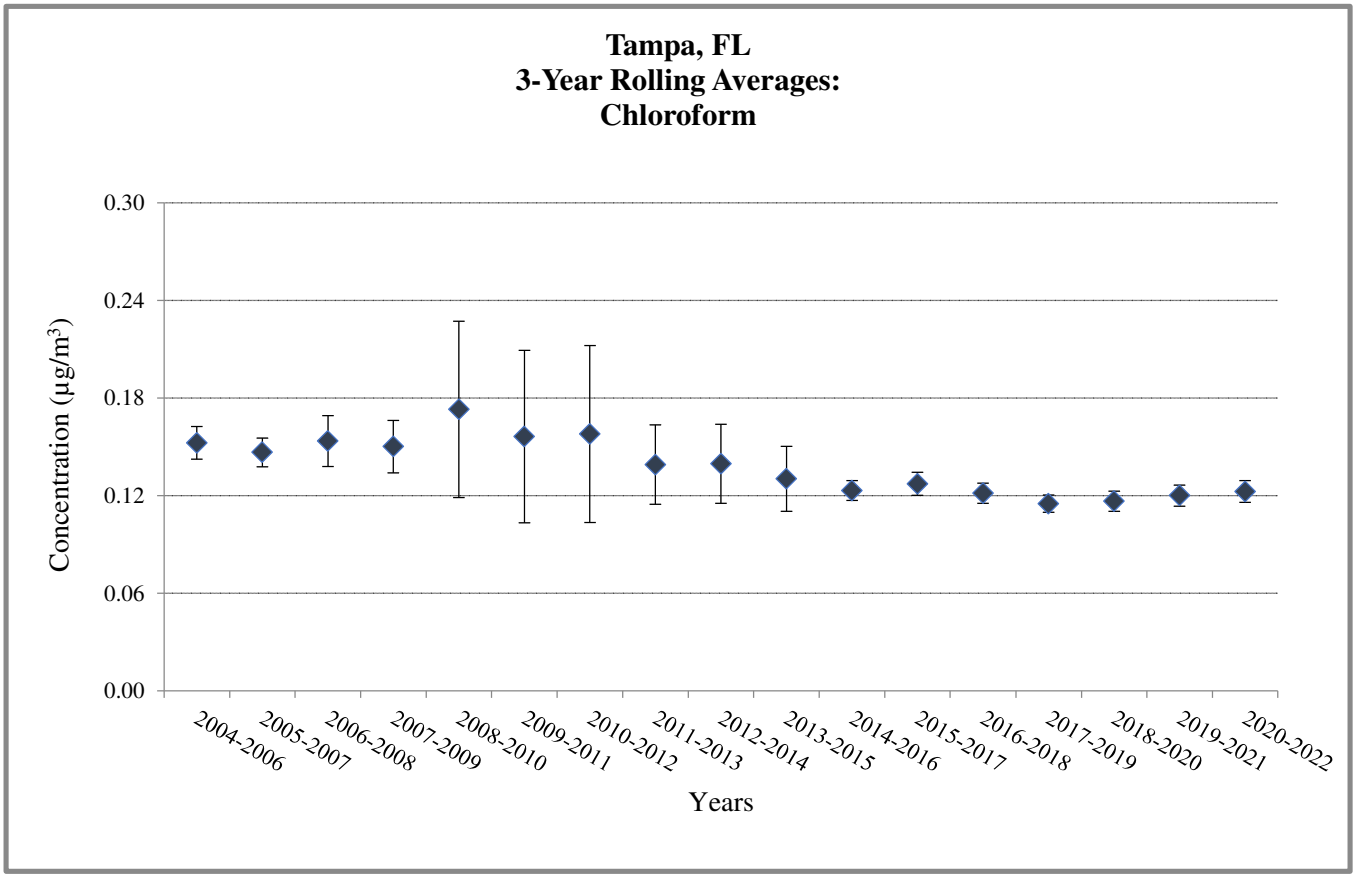
Figure 4. Tampa, FL - 3-Year Rolling Average Concentrations

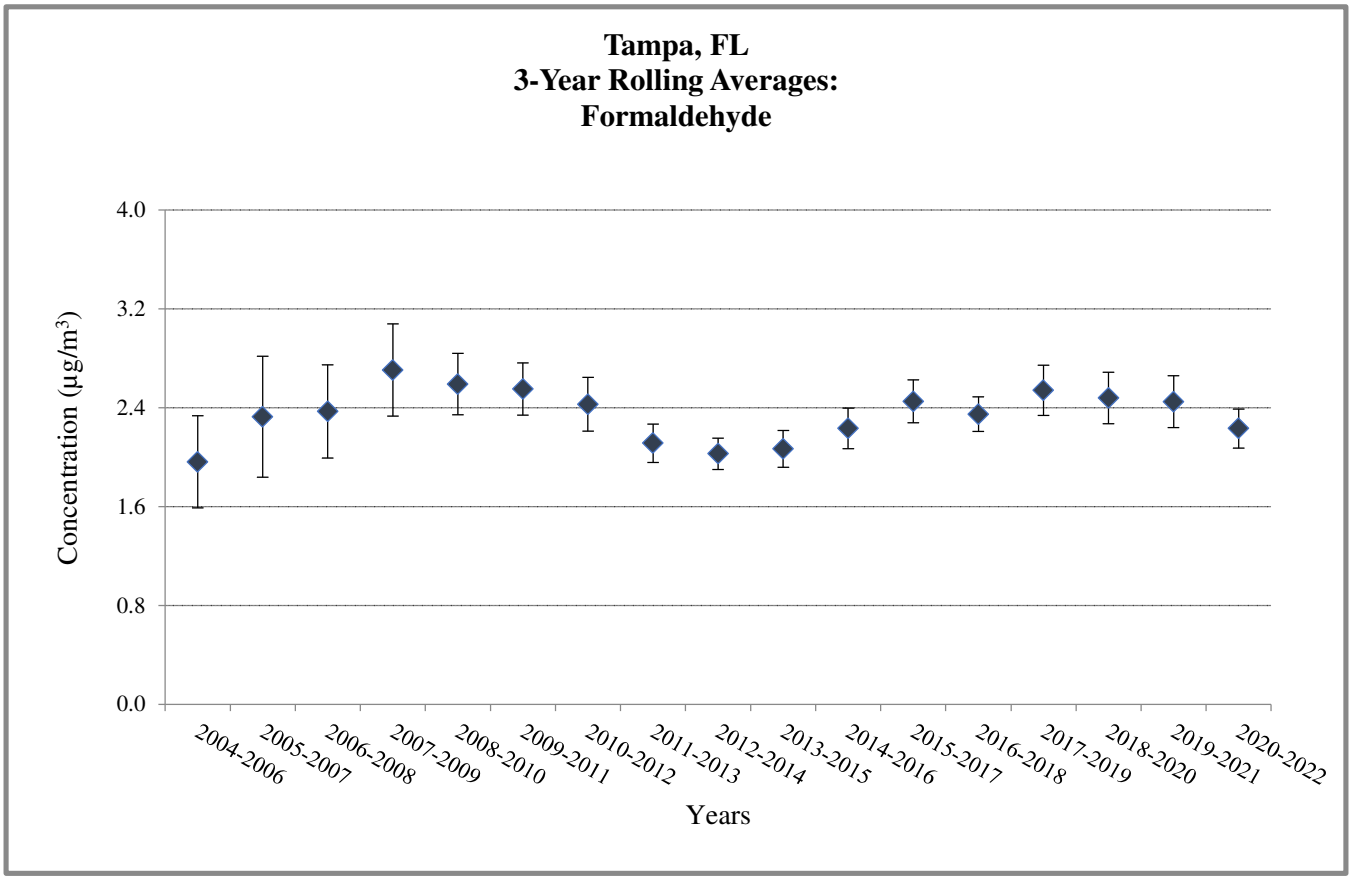




Does not meet MQO or wasn't able to collect enough samples

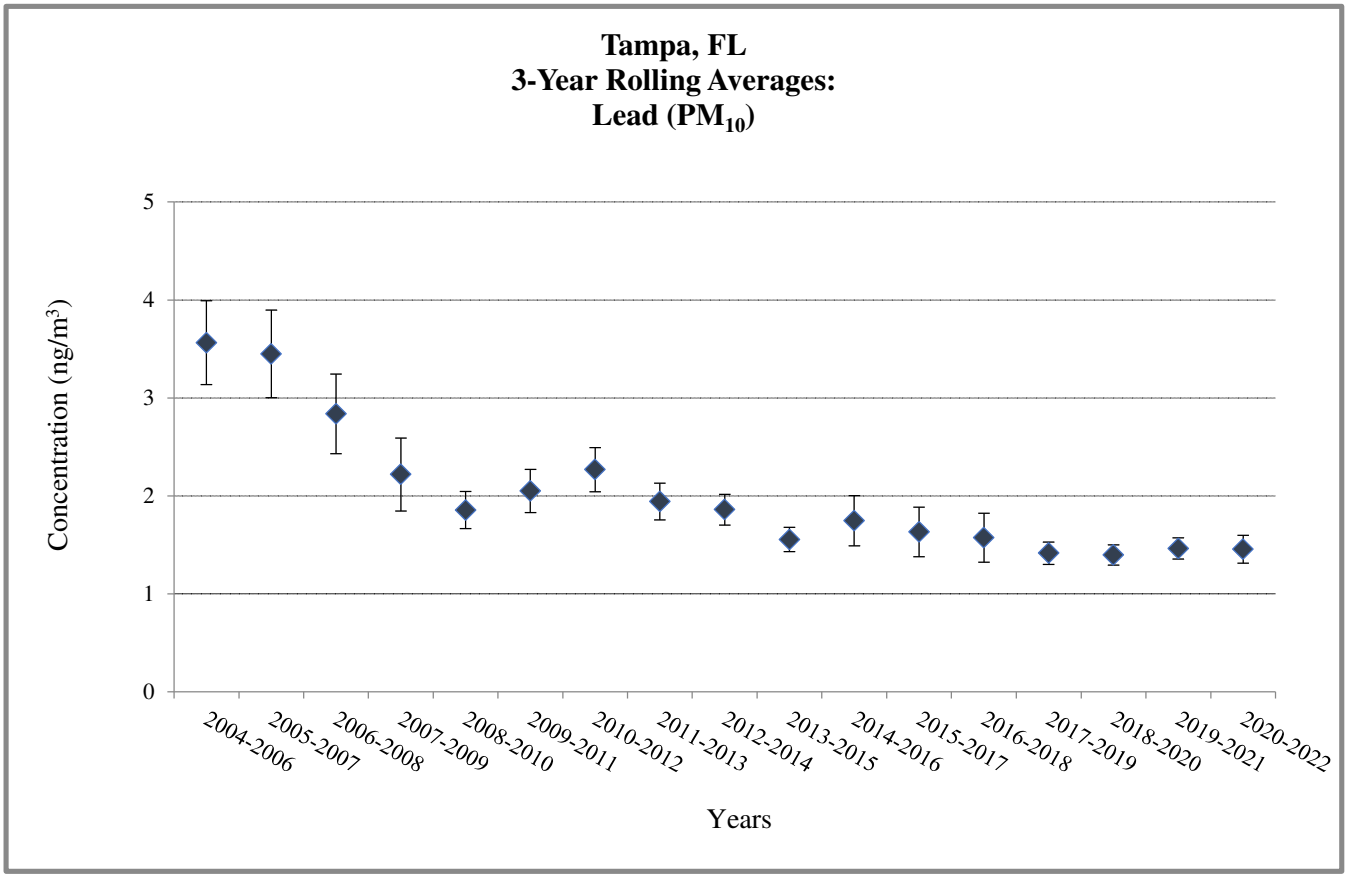
Figure 4. Tampa, FL - 3-Year Rolling Average Concentrations

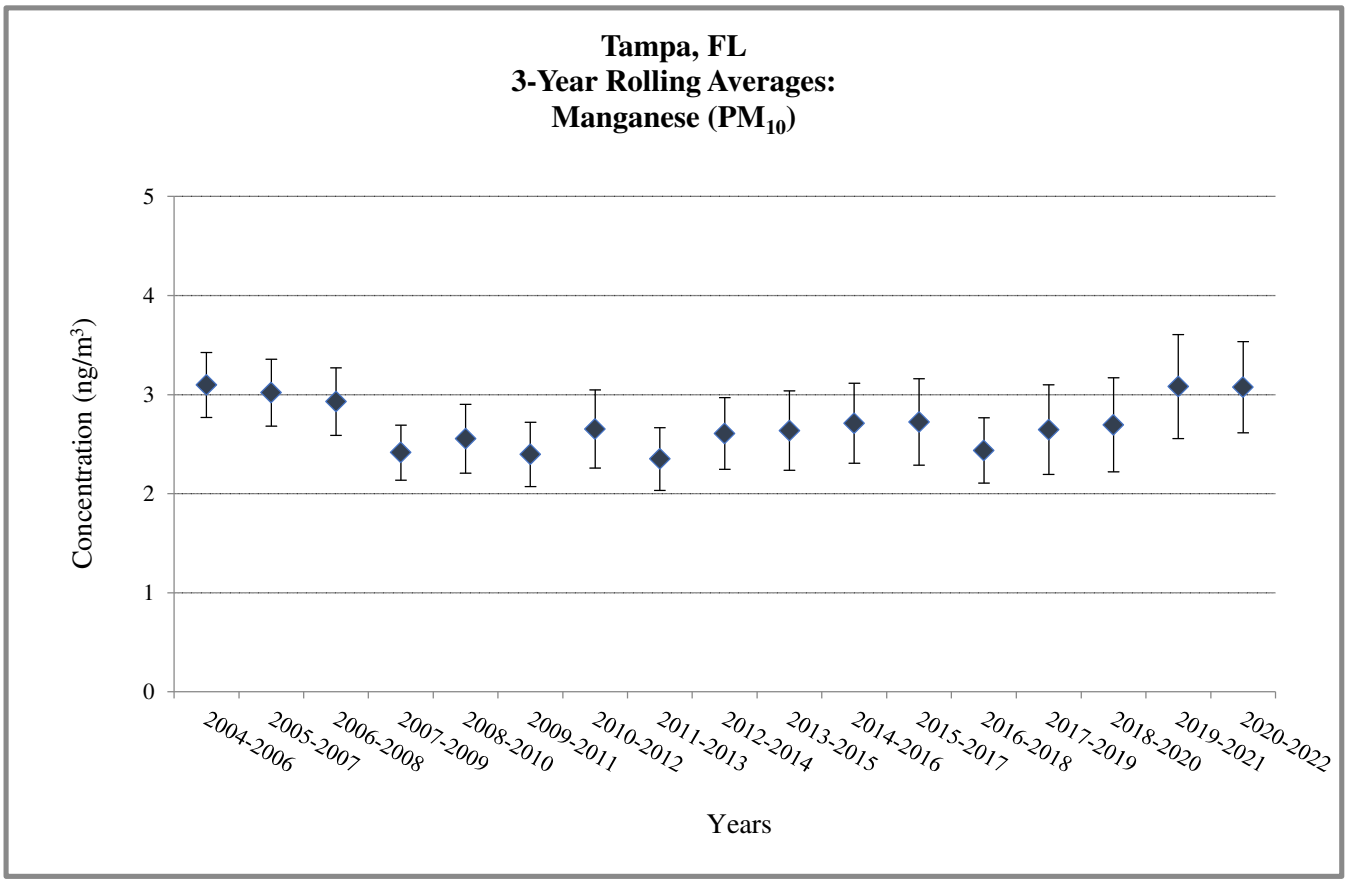




Does not meet MQO or wasn't able to collect enough samples

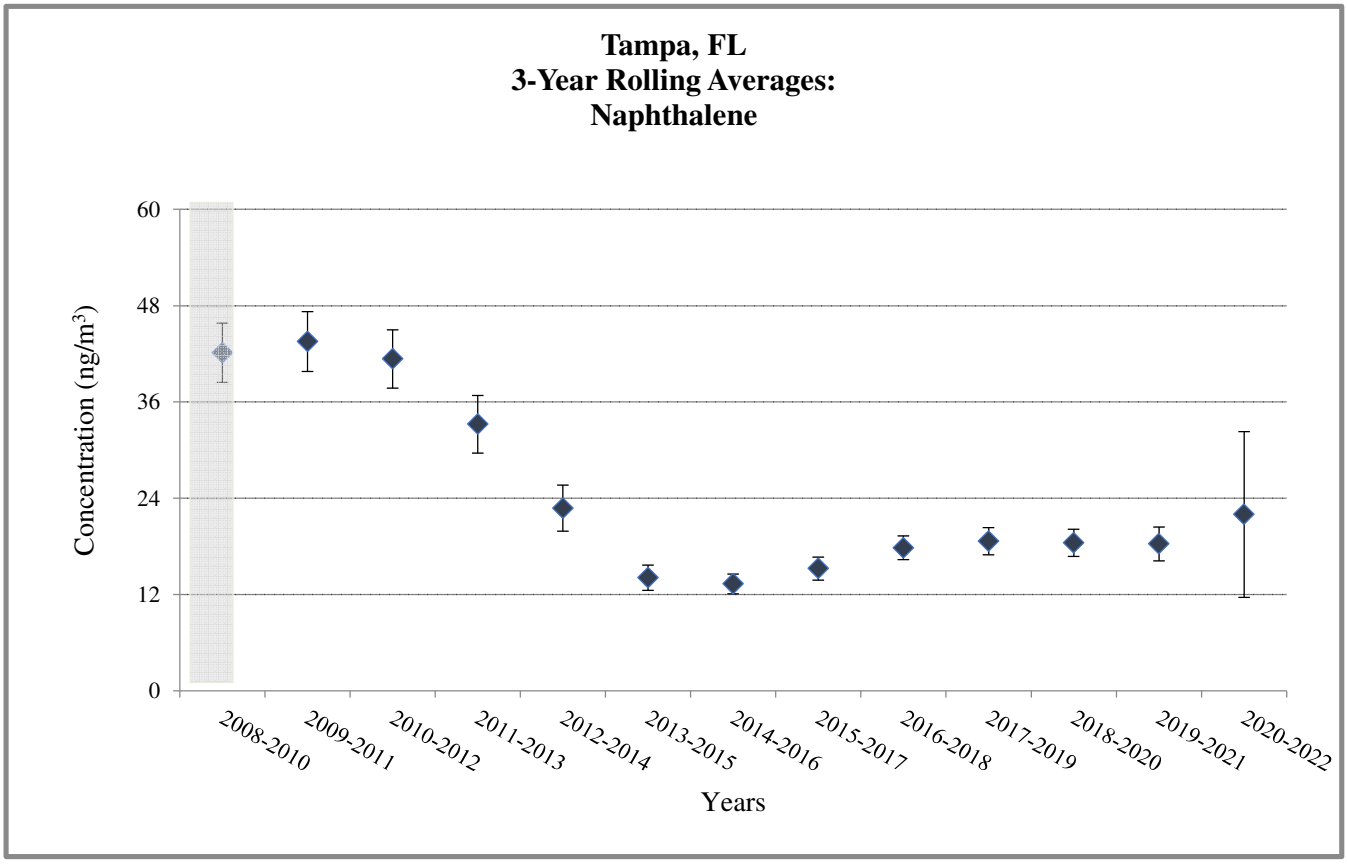
Figure 4. Tampa, FL - 3-Year Rolling Average Concentrations

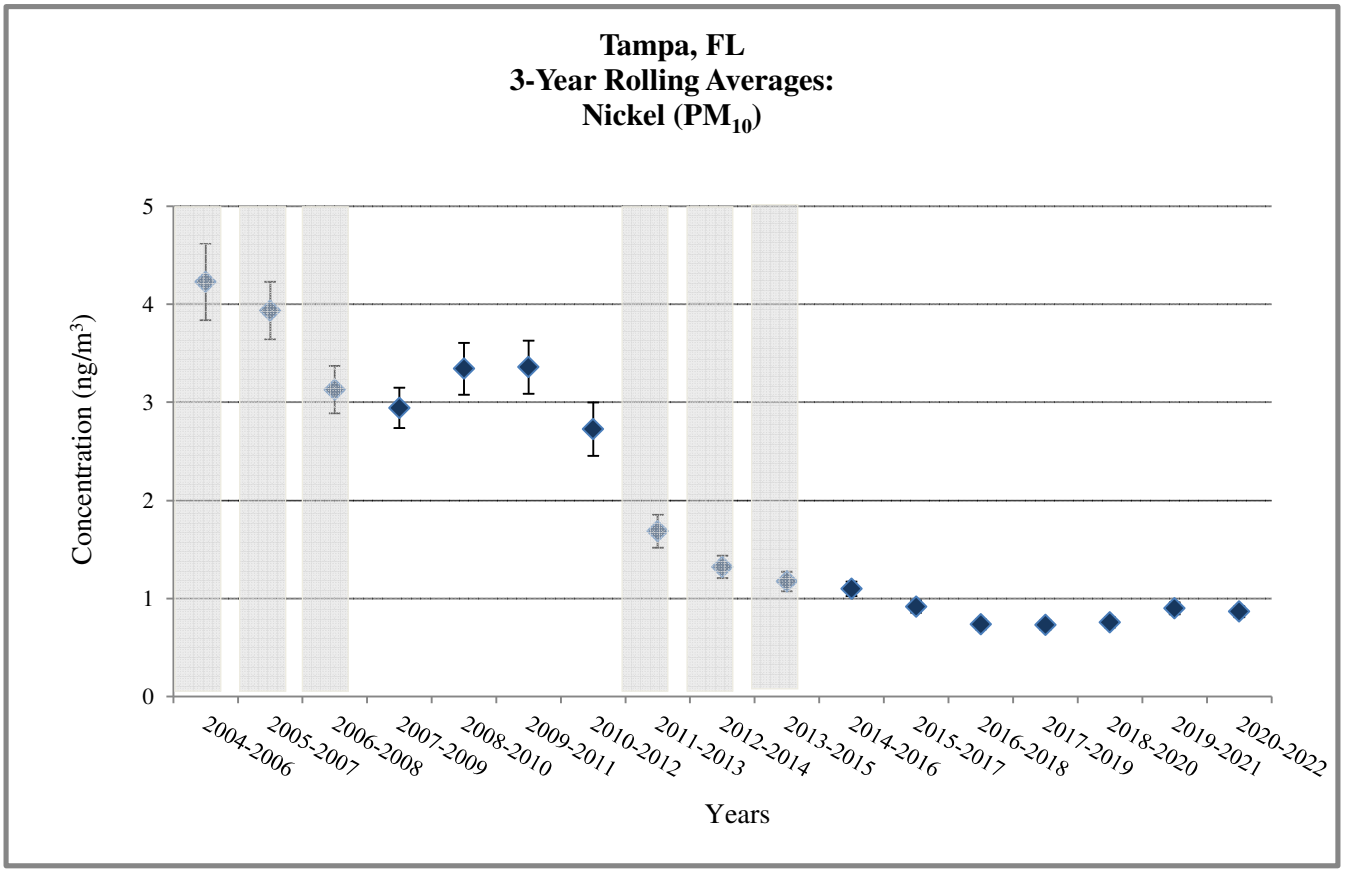




Does not meet MQO or wasn't able to collect enough samples

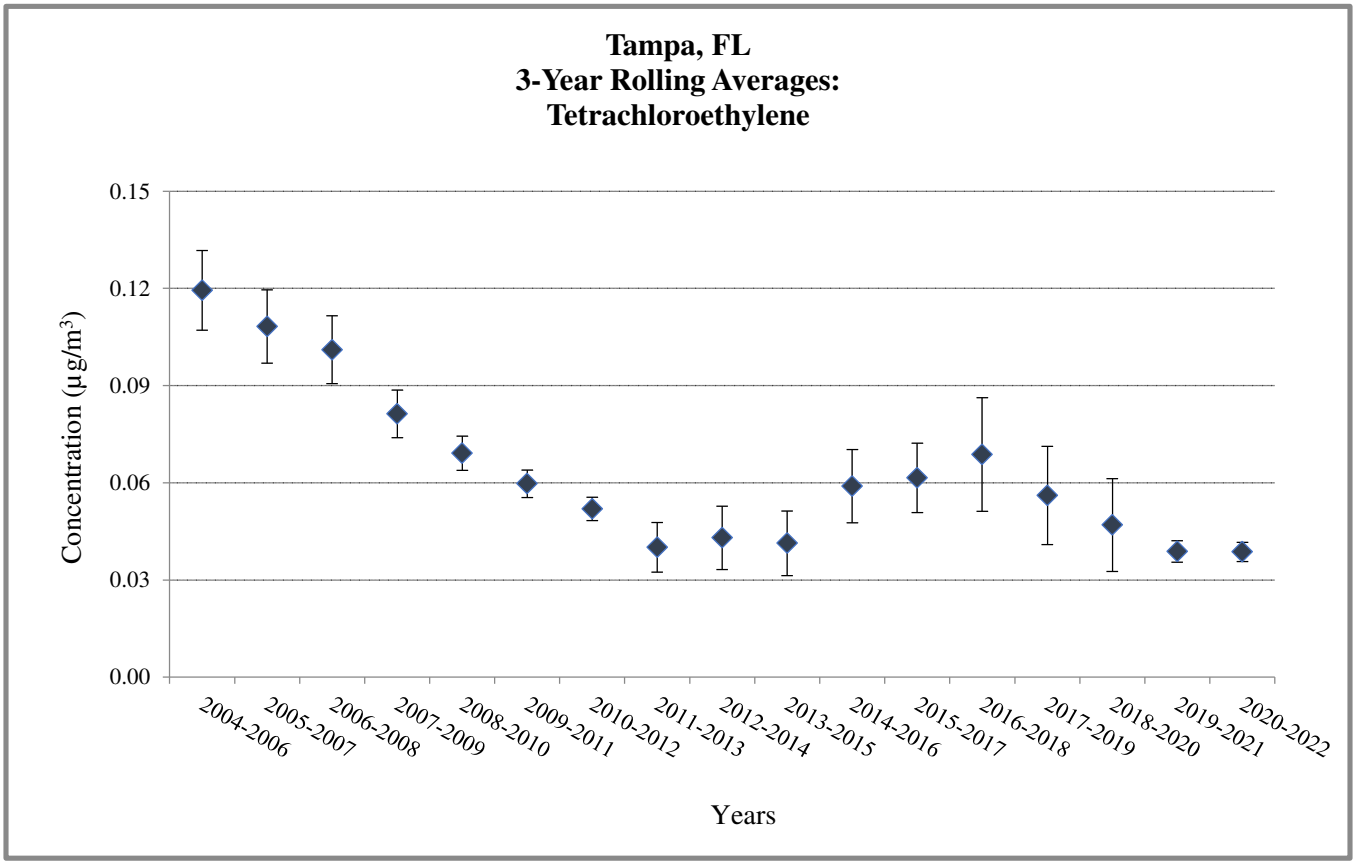
Figure 4. Tampa, FL - 3-Year Rolling Average Concentrations

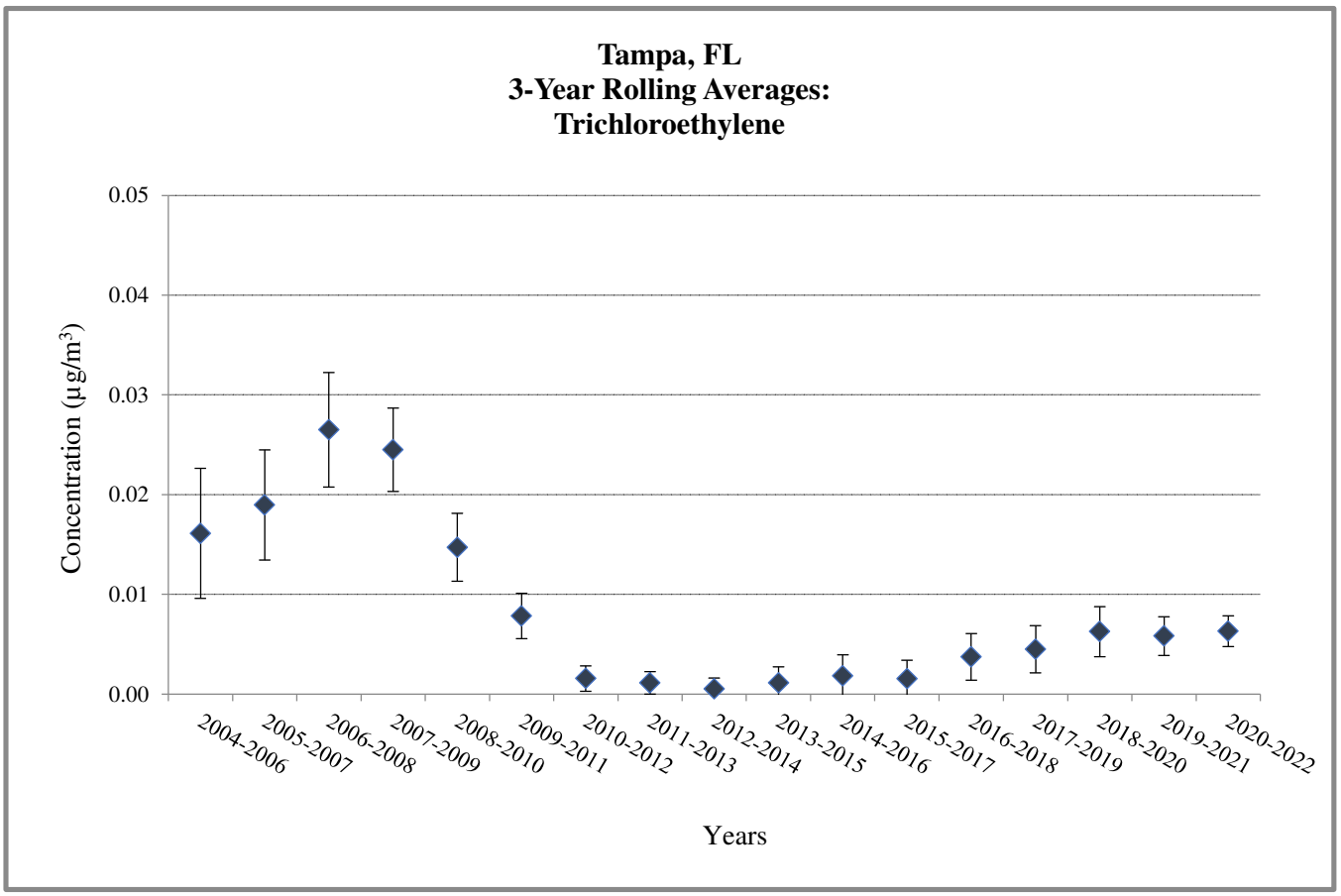




Does not meet MQO or wasn't able to collect enough samples

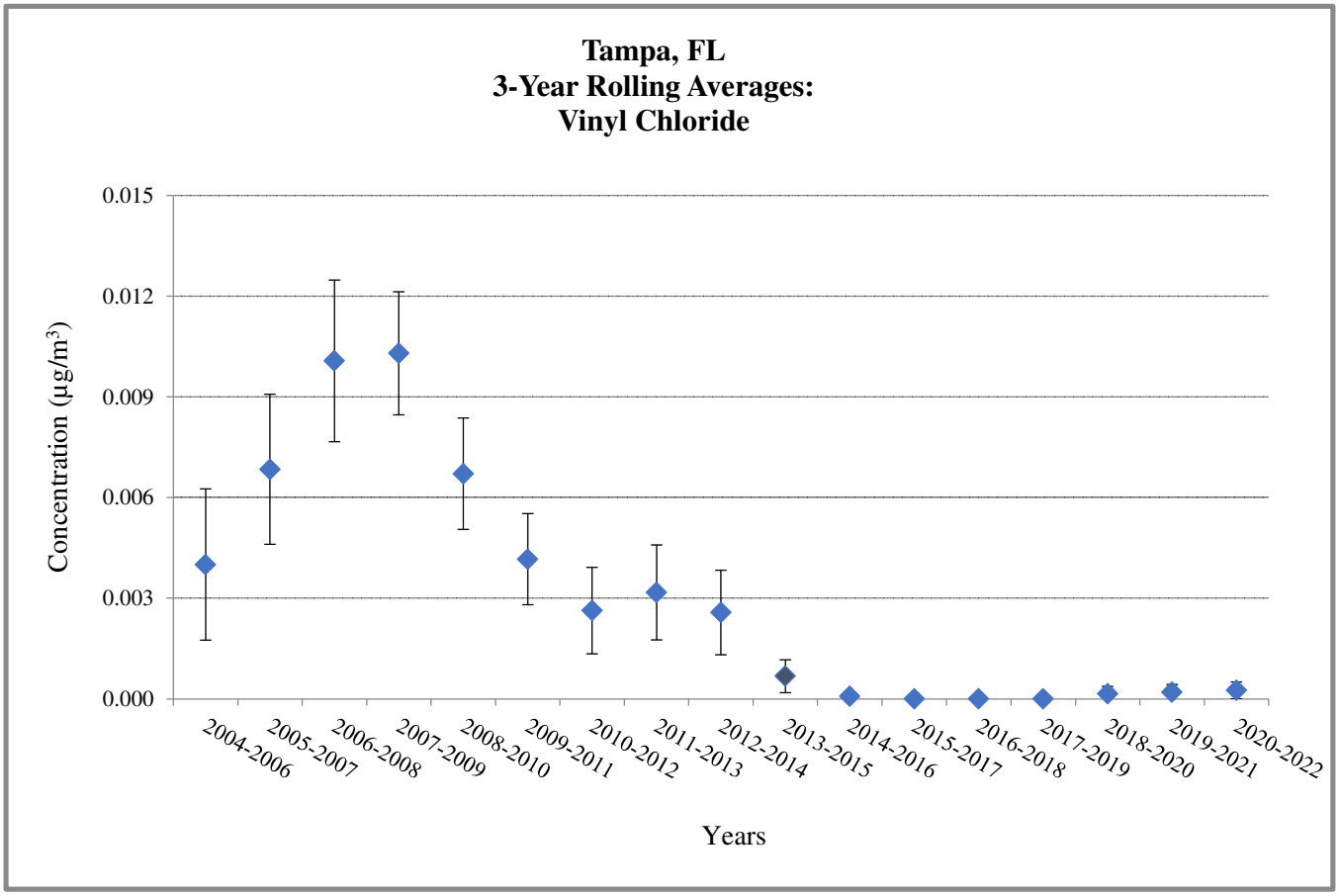
Figure 4. Tampa, FL - 3-Year Rolling Average Concentrations





Does not meet MQO or wasn't able to collect enough samples

Figure 4. Tampa, FL - 3-Year Rolling Average Concentrations



Does not meet MQO or wasn't able to collect enough samples

Table 6. NATTS Network Assessment: MQO#1 - Completeness Percentage at Tampa, FL

Year	Benzene	Butadiene, 1,3-	Carbon tetrachloride	Chloroform	Tetrachloroethylene	Trichloroethylene	Vinyl chloride	Acetaldehyde	Formaldehyde	Arsenic (PM10)	Beryllium (PM10)	Cadmium (PM10)	Lead (PM10)	Manganese (PM10)	Nickel (PM10)	Benzo(a)pyrene	Naphthalene
	VOCs							Carbonyls		PM10 Metals						PAHs	
Tampa, FL (AQS Site Code: 12-057-3002)																	
2004	95	95	95	95	95	92	95	98	98	97	97	97	97	97	97	--	--
2005	98	98	98	98	98	98	98	97	97	97	97	97	97	97	97	--	--
2006	95	95	95	95	95	95	95	100	100	100	100	100	100	100	100	--	--
2007	100	100	100	100	98	100	100	100	100	100	100	100	100	100	100	--	--
2008	98	98	98	98	98	98	98	98	98	95	95	95	95	95	95	--a	--a
2009	100	100	100	100	100	100	100	98	98	102	103	100	100	100	100	98	98
2010	126	126	126	126	126	126	126	100	100	103	100	100	100	100	100	98	98
2011	98	98	98	98	98	98	98	98	98	113	107	107	107	100	100	98	98
2012	98	98	98	98	98	98	98	98	98	93	90	100	100	100	100	97	97
2013	95	95	95	95	95	95	95	100	100	90	93	95	95	95	95	95	93
2014	97	97	97	97	97	97	97	90	90	100	100	100	100	100	100	100	100
2015	98	98	98	98	98	98	98	95	95	100	100	100	100	100	100	98	98
2016	98	98	98	98	98	98	98	92	92	100	100	100	100	100	100	100	100
2017	93	93	93	93	93	93	93	89	89	102	102	102	102	102	102	100	100
2018	98	98	98	98	98	98	98	98	98	102	102	102	102	102	102	98	98
2019	100	100	100	100	100	100	100	90	92	95	95	95	95	95	95	98	98
2020	98	98	98	97	98	98	98	95	95	100	100	100	100	100	100	100	100
2021	100	100	100	100	100	100	100	97	97	100	100	100	100	100	100	98	98
2022	98	98	98	98	98	98	98	93	93	100	100	100	100	100	100	100	100

A-rated: ≥85%
B-rated: Between 75% to 85%
Does not meet: ≤75%
-- No data available

[a]: Scheduled sampling ended midway through the year, thus, the site did not have the opportunity to collect enough samples to meet the 85% MQO.

Table 7. NATTS Network Assessment: MQO#2 - Reported Method Detection Limits (MDLs) at Tampa, FL

Year	Benzene	Butadiene, 1,3-	Carbon tetrachlorid	Chloroform	Tetrachloroethylene	Trichloroethylene	Vinyl chloride	Acetaldehyde	Formaldehyde	Arsenic (PM10)	Beryllium (PM10)	Cadmium (PM10)	Lead (PM10)	Manganese (PM10)	Nickel (PM10)	Benzo(a)pyrene	Naphthalene
	VOCs							Carbonyls		PM10 Metals						PAHs	
Tampa, FL (AQS Site Code: 12-057-3002)																	
2004	0.49	0.66	0.74	0.20	0.80	0.32	0.70	0.04	0.02	8.70	0.09	0.11	0.05	0.02	1.43	--	--
2005	0.49	0.66	0.74	0.20	0.80	0.21	0.70	0.05	0.02	5.65	0.09	0.30	0.05	0.04	0.81	--	--
2006	0.49	0.88	1.11	0.20	0.80	0.21	0.93	0.02	0.01	6.09	0.24	0.57	0.05	0.04	2.33	--	--
2007	0.47	0.86	0.96	0.24	1.12	0.27	0.91	0.01	0.01	2.43	0.05	0.27	0.025	0.04	0.29	--	--
2008	0.27	0.44	0.37	0.12	0.24	0.11	0.51	0.01	0.01	1.65	0.36	0.27	0.05	0.04	0.88	0.04	0.009
2009	0.49	0.53	0.81	0.17	0.72	0.21	0.46	0.02	0.01	1.86	0.44	0.25	0.06	0.03	0.41	0.07	0.008
2010	0.10	0.15	0.19	0.06	0.20	0.08	0.14	0.02	0.00	1.85	0.44	0.25	0.06	0.03	0.40	0.04	0.010
2011	0.22	0.33	0.26	0.07	0.20	0.10	0.37	0.02	0.01	1.89	0.45	0.25	0.07	0.03	0.41	0.04	0.004
2012	0.15	0.29	0.19	0.05	0.16	0.04	0.30	0.02	0.01	1.86	0.44	0.25	0.06	0.03	0.41	0.06	0.005
2013	0.10	0.24	0.19	0.03	0.16	0.13	0.26	0.03	0.18	1.92	0.46	0.26	0.07	0.03	0.42	0.07	0.008
2014	0.17	0.20	0.30	0.07	0.24	0.24	0.28	0.02	0.12	0.82	0.20	0.07	0.02	0.03	0.27	0.35	0.008
2015	0.05	0.22	0.07	0.02	0.08	0.08	0.09	0.02	0.15	0.47	0.52	0.35	0.03	0.04	0.04	0.04	0.008
2016	0.05	0.11	0.07	0.02	0.12	0.05	0.14	0.02	0.12	0.11	0.03	0.05	0.02	0.03	0.05	0.03	0.065
2017	0.15	0.07	0.11	0.02	0.24	0.08	0.12	0.07	0.58	0.13	0.01	0.01	0.003	0.02	0.32	0.03	0.004
2018	0.27	0.38	0.19	0.08	0.12	0.24	0.19	0.07	0.61	0.13	0.01	0.01	0.003	0.02	0.11	0.07	0.004
2019	0.10	0.09	0.07	0.02	0.08	0.13	0.09	0.06	0.55	0.22	0.05	0.04	0.01	0.05	0.11	0.18	0.042
2020	0.10	0.26	0.04	0.02	0.08	0.08	0.28	0.07	0.52	0.22	0.05	0.03	0.01	0.05	0.11	0.07	0.008
2021	0.15	0.04	0.07	0.02	0.04	0.05	0.07	0.06	0.49	0.22	0.08	0.03	0.01	0.16	0.60	0.07	0.008
2022	0.12	0.04	0.07	0.02	0.04	0.05	0.09	0.07	0.49	0.28	0.03	0.02	0.01	0.04	0.24	0.07	0.008

A-rated: MDL to Target MDL ratio ≤ 1

B-rated" MDL to Target MDL ratio between 1 and 2

Does Not Meet MDL to Target MDL ratio>2

-- No data available

Table 8. NATTS Network Assessment: MQO#3 - Bias Percent Difference at Tampa, FL

Year	Benzene	Butadiene, 1,3-	Carbon tetrachlorid	Chloroform	Tetrachloroethylene	Trichloroethylene	Vinyl chloride	Acetaldehyde	Formaldehyde	Arsenic (PM10)	Beryllium (PM10)	Cadmium (PM10)	Lead (PM10)	Manganese (PM10)	Nickel (PM10)	Benzo(a)pyrene	Naphthalene
	VOCs							Carbonyls		PM10 Metals						PAHs	
Tampa, FL (AQS Site Code: 12-057-3002)																	
2004	-10.1	-33.6	-4.8	-14.8	-9.9	-7.4	-23.5	1.0	-0.9	--a	--a	--a	--a	--a	--a	--	--
2005	7.6	6.9	15.2	10.5	-2.4	-4.4	-0.5	8.9	0.8	20.4	13.6	11.2	4.6	3.8	13.7	--	--
2006	-6.0	2.4	-6.6	-8.8	-15.4	23.9	-2.8	-0.8	-13.2	4.7	7.7	1.6	-2.6	-1.4	14.9	--	--
2007	-21.5	-8.5	-9.8	-17.6	-23.7	-15.3	-15.4	-1.9	-3.2	8.1	18.6	4.1	-6.1	-14.4	-8.5	--	--
2008	1.8	17.1	0.0	-7.0	-15.9	-4.7	-11.4	24.6	14.4	-2.8	0.0	1.2	-11.0	-27.8	2.1	--b	--b
2009	-9.1	-6.8	-9.6	-13.1	-11.3	-10.3	-5.8	-10.1	-7.8	12.5	37.3	24.1	-3.8	4.8	12.9	-1.7	-7.7
2010	-10.9	29.4	-9.6	-16.6	-23.5	-17.1	0.9	0.7	-2.8	1.0	3.0	0.0	-8.8	-4.9	7.1	-2.3	-17.1
2011	6.0	3.1	2.2	-10.8	8.4	-1.3	-2.1	3.0	-3.4	24.7	-7.0	-4.6	0.6	-1.1	-5.4	-2.1	-13.9
2012	--b	--b	--b	--b	--b	--b	--b	--b	--b	3.1	9.3	7.0	16.9	13.8	21.9	25.2	21.4
2013	-0.5	-3.2	-6.3	-6.0	-2.5	3.6	-6.0	0.1	-0.5	-17.4	23.1	1.8	-20.5	-3.6	-75.7	-6.3	24.6
2014	2.1	-3.9	2.6	1.1	0.5	3.5	5.1	-4.3	-2.2	0.6	--c	--c	0.5	4.7	--d	-16.3	0.7
2015	-8.1	-6.0	3.3	-7.8	-15.5	-16.7	-6.4	--b	--b	--b	--b	--b	--b	--b	--b	-1.4	-17.4
2016	-4.8	-4.7	10.5	-5.1	-8.6	-10.2	-8.3	-5.4	-19.1	-1.8	2.1	2.0	1.9	-0.3	36.0	10.5	-30.4
2017	-1.2	-2.0	-1.7	-0.5	-0.5	-1.9	-6.3	3.6	-5.3	-4.4	-3.4	-2.0	-4.1	-6.4	15.2	-0.7	-39.9
2018	-2.9	-7.3	-8.6	-3.3	-4.1	1.3	-7.2	-8.7	-3.7	1.3	-1.1	3.1	-3.8	2.2	13.6	-1.3	-18.9
2019	-3.8	1.1	-1.6	-1.4	-6.4	3.5	-3.5	-3.1	-5.8	8.4	7.7	3.2	6.5	8.3	5.4	-16.8	5.8
2020	-13.7	5.6	-13.2	-0.5	-8.5	1.0	-10.2	1.6	-1.9	2.1	-2.0	1.2	-5.1	5.7	4.8	-25.4	-2.9
2021	-2.8	0.8	-4.1	3.8	-4.3	2.8	-1.8	-9.5	-11.2	7.6	3.3	2.6	3.2	1.8	5.0	58.5	-8.7
2022	-18.9	-13.3	-25.3	-18.4	-16.3	-18.1	-21.4	-1.5	-1.0	--b	--b	--b	--b	--b	--b	--b	--b

A-rated:±25%

B-rated: Between 25% to 35% or between -25% to -35%

Does not meet:>35% or <35%

-- No data available

[a]: Bias data presented is an average of the ERG and SCAPCD PT results.

[b]: No Proficiency Test samples were sent for this pollutant and year.

[c]: The Proficiency Test sample for this pollutant was 0; the site reported a concentration as "< MDL", rather than 0. EPA accepted this result.

[d]: Although a Proficiency Test sample was sent to the lab supporting this site and year, the results were nullified by EPA due to QA issues.

Table 9. NATTS Network Assessment: MQO#4 - Overall Method Precision %CV at Tampa, FL

Year	Benzene	Butadiene, 1,3-	Carbon tetrachloride	Chloroform	Tetrachloroethylene	Trichloroethylene	Vinyl chloride	Acetaldehyde	Formaldehyde	Arsenic (PM10)	Beryllium (PM10)	Cadmium (PM10)	Lead (PM10)	Manganese (PM10)	Nickel (PM10)	Benzo(a)pyrene	Naphthalene
	VOCs							Carbonyls		PM10 Metals						PAHs	
Tampa, FL (AQS Site Code: 12-057-3002)																	
2004	--	--	--	--	--	--	--	15.1	16.1	10.2	13.4	15.5	26.3	9.4	19.4	--	--
2005	--	--	--	--	--	--	--	2.5	7.3	8.3	12.9	25.1	18.4	10.1	19.4	--	--
2006	--	--	--	--	--	--	--	13.4	11.4	6.4	--a	14.3	12.6	11.7	10.3	--	--
2007	--	--	--	--	--	--	--	37.4	44.5	25.3	21.6	14.0	16.0	14.6	21.7	--	--
2008	--	--	--	--	--	--	--	4.4	4.3	15.2	--a	7.2	10.4	10.7	18.1	--a	17.0
2009	--	--	--	--	--	--	--	2.0	6.6	14.0	--a	11.9	10.1	13.3	15.2	50.6	20.8
2010	--	--	--	--	--	--	--	3.6	6.1	13.8	--a	12.4	10.3	7.9	22.3	--a	8.0
2011	--	--	--	--	--	--	--	2.1	2.8	21.9	--a	8.2	9.5	10.3	24.5	13.8	15.3
2012	--	--	--	--	--	--	--	4.3	12.1	29.5	--a	8.1	21.2	7.5	14.3	--a	10.7
2013	--	--	--	--	--	--	--	4.4	3.2	30.4	8.2	6.9	15.9	11.9	31.6	--a	53.9
2014	--	--	--	--	--	--	--	1.6	2.6	9.6	--a	30.4	15.1	9.2	22.7	30.6	48.4
2015	--	--	--	--	--	--	--	--	--	5.0	--a	17.0	13.5	13.3	26.0	8.7	22.8
2016	--	--	--	--	--	--	--	--	--	4.4	--a	24.4	10.5	5.3	18.7	5.6	42.4
2017	--	--	--	--	--	--	--	7.5	3.7	14.3	20.2	22.5	15.7	11.0	9.6	6.5	42.6
2018	--	--	--	--	--	--	--	6.0	7.7	10.5	7.7	23.9	20.9	6.8	4.6	3.0	11.2
2019	--	--	--	--	--	--	--	1.1	2.2	7.3	--a	30.2	10.9	4.7	12.3	--a	15.1
2020	--	--	--	--	--	--	--	2.9	1.2	7.4	5.8	24.3	26.6	6.4	7.7	--a	39.4
2021	--	--	--	--	--	--	--	7.4	8.6	4.0	--a	21.9	12.6	4.1	--a	--a	40.0
2022	--	--	--	--	--	--	--	11.2	7.1	5.7	--a	21.9	7.4	17.2	6.2	--a	51.0

Green = precision ≤ 15%

Yellow = precision > 15% to ≤ 25%

Red = precision > 25%

-- Gray = dataset was not rated

[a]: The primary and/or replicate value were less than the MDL, so no calculation could be made.

Table 10. NATTS Network Assessment: MQO#4 - Analytical Method Precision %CV at Tampa, FL

Year	Benzene	Butadiene, 1,3-	Carbon tetrachlorid	Chloroform	Tetrachloroethylene	Trichloroethylene	Vinyl chloride	Acetaldehyde	Formaldehyde	Arsenic (PM10)	Beryllium (PM10)	Cadmium (PM10)	Lead (PM10)	Manganese (PM10)	Nickel (PM10)	Benzo(a)pyrene	Naphthalene
	VOCs							Carbonyls		PM10 Metals						PAHs	
Tampa, FL (AQS Site Code: 12-057-3002)																	
2004	--	--	--	--	--	--	--	3.0	3.8	--	--	--	--	--	--	--	--
2005	--	--	--	--	--	--	--	1.6	0.7	--	--	--	--	--	--	--	--
2006	--	--	--	--	--	--	--	1.3	0.8	--	--	--	--	--	--	--	--
2007	--	--	--	--	--	--	--	0.5	0.7	--	--	--	--	--	--	--	--
2008	--	--	--	--	--	--	--	0.9	1.1	--	--	--	--	--	--	--a	3.0
2009	--	--	--	--	--	--	--	0.7	0.7	--	--	--	--	--	--	4.6	3.2
2010	--	--	--	--	--	--	--	0.6	0.5	--	--	--	--	--	--	2.9	4.0
2011	4.0	21.1	0.6	6.3	20.2	--a	--a	0.5	0.4	22.4	--a	7.9	11.1	6.6	23.0	6.7	3.3
2012	2.4	7.2	5.7	5.4	8.3	--a	--a	0.5	1.9	24.9	--a	8.4	12.6	5.6	28.0	--a	2.1
2013	1.2	7.9	2.0	6.0	0.0	--a	--a	2.4	1.0	23.5	19.0	10.8	15.6	8.7	26.7	--a	4.2
2014	2.6	5.1	2.0	--a	--a	--a	--a	0.6	1.1	11.3	--a	26.2	15.4	9.4	17.3	--b	--b
2015	1.6	11.3	1.5	3.1	5.6	--a	--a	6.2	15.5	--b	--b	--b	--b	--b	--b	--b	--b
2016	0.9	6.7	1.7	2.4	7.4	--a	--a	5.6	10.9	3.2	3.0	16.5	11.6	3.8	22.1	--b	--b
2017	1.3	9.1	1.7	4.3	7.3	35.4	--a	1.3	0.7	3.9	10.0	17.4	8.0	5.7	11.3	12.0	1.1
2018	3.1	5.4	2.9	4.8	7.4	0.0	--a	1.2	1.1	4.1	7.2	16.6	15.0	3.1	6.7	--a	0.7
2019	3.8	12.6	2.0	4.9	11.0	0.0	--a	0.4	0.3	3.2	8.3	15.2	7.3	4.3	9.6	0.6	0.6
2020	1.0	6.3	0.9	4.2	8.1	0.0	--a	0.3	0.2	6.4	0.0	11.2	10.5	3.9	7.6	--a	1.4
2021	0.7	6.3	1.0	1.1	4.4	--a	--a	0.7	0.6	3.0	--a	7.2	10.2	4.1	--a	1.1	3.0
2022	10.7	10.6	9.2	12.3	13.6	0.0	--a	2.8	0.7	2.0	--a	6.0	5.2	16.2	4.3	0.7	30.9

A-rated:≤ 15% CV

B-rated: Between 15%CV to25% CV

Does Not Meet: >25% CV or did not report Precision (required in the NATTS Workplan Template since 2012)

-- No data available

[a]: The primary and/or replicate value were less than the MDL, so no calculation could be made.

[b]: Per the NATTS Workplan template, analytical replicates were required to be reported to AQS for this sampling year.

Appendix A. Equipment Inventory

Pollutant Type	Year(s)	Manufacturer/Model, Extraction Type, and Year
Sampling Equipment		
Carbonyls	2004	ERG custom-made Model C (Year Deployed: 2004)
	2005-2012	ERG custom-made Model C-4 (Year Deployed: 2004)
	2013	ERG custom-made Model C-8 (Year Deployed: 2013)
	2014	ERG custom-made Model C-2 (Year Deployed: 2014)
	2015	ERG custom-made Model C-18 (Year Deployed: 2015)
	2016	ERG custom-made Model C-3 (Year Deployed: 2016)
	2017	ERG custom-made Model C-17 (Year Deployed: 2017)
	2018	ERG custom-made Model C-18 (Year Deployed: 2018)
	2019	ERG custom-made Model C-17 (Year Deployed: 2017)
	2020-2021	ERG custom-made Model C-18 (Year Deployed: 2018)
	2022	ERG custom-made Model C-17 (Year Deployed: 2017)
PAHs	2008-2012	General Metal Works GPS-1 PUF Sampler/Graesby 670 Sampler (Year Deployed: 2008)
	2013	Tisch Environmental TE-1000 PUF Sampler (Year Deployed: 2013)
	2014-2022	Tisch TE1000 Hi-Vol (2) (Year Deployed: 2014)
PM_{10} Metals	2004-2010	Andersen Hi-Volume PM10 Sampler (Year Deployed: 1992)
	2011-2018	General Metal Works Model SSI PM10 Sampler (Year Deployed: 1999)
	2019-2022	Tisch PM10 Sampler (Year Deployed: Unknown)
VOCs	2004-2022	Custom-built (Year Deployed: 2004)
Analytical Equipment		
Carbonyls	2004-2017	Waters Alliance 2695 HPLC /model 2487 Dual Absorbance (Year Deployed: 2003)
	2018	Waters Alliance e2695 HPLC /model 2489 Dual Asorbance UV/Vis (Year Deployed: 2018)
	2019-2022	Waters Alliance 2695 HPLC /model 2489 Dual Absorbance (Year Deployed: 2018)
PAHs	2008-2013	HP/Agilent 5890/5971 GC/MS (Year Deployed: 2008)
	2014-2020	HP/Agilent 7890B/5975C GC/MS (Year Deployed: 2014)
	2021-2022	Agilent 7890B/5975C GC/MS (Year Deployed: 2015); Agilent 7890B/7000C GC/MS (Year Deployed: 2021)
PM_{10} Metals	2004-2013	PE Optima 2000 ICP-OES (Year Deployed: 2001)
	2014-2022	Perkin-Elmer NexION 300X ICP-MS (Year Deployed: 2014)
VOCs	2004-2013	HP/Agilent 6890/5973 GC/MS (Year Deployed: 2001)
	2014-2015	HP/Agilent 7890/5975 GC/MS (Year Deployed: 2014)
	2016-2021	Agilent 7890A/5975C GC/MS (Year Deployed: 2016)
	2022	Agilent 8890/5977B GC/MS (Year Deployed: 2022)
Preconcentrator Equipment		
VOCs	2004-2005	Entech 7100 (Dynamic Dilution) (Year Deployed: 2001)
	2006-2013	Entech 7100A (Year Deployed: 2006)
	2014-2021	Entech 7200 (Year Deployed: 2014)
	2022	Entech 7200 (Year Deployed: 2014); Entech 7200CTS (Year Deployed: 2022)
Standards Preparation Equipment		
VOCs	2004-2006	Ashcroft pressure gauge (Pressure Dilution) (Year Deployed: 2003)
	2007-2022	Heise Digital Gauge (dynamic dilution) (Year Deployed: 2007)
Canister Cleaning Equipment		
VOCs	2004	Entech 3000 (Hot) (Year Deployed: 1997)
	2005-2015	Entech 3100A (Hot) (Year Deployed: 2005)
	2016-2022	Entech 3100 (Hot) (Year Deployed: 2005)
PM_{10} Extraction Equipment		
PM_{10} Metals	2004-2006	Thermolyne 2200 (Hotblock) (Year Deployed: 2004)
	2007-2022	SCP Digiprep (Hotblock) (Year Deployed: 2006)
PAHs Extraction Equipment		
PAHs	2008-2013	Dionex -300 (ASE) (Year Deployed: 2004)
	2014-2022	Dionex -350 (ASE) (Year Deployed: 2019)